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v.20



ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: XX

DATE: Wednesday, June 29th, 1988

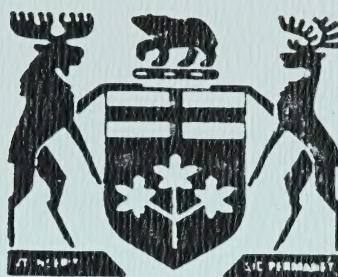
BEFORE: M.I. JEFFERY, Q.C., Chairman
E. MARTEL, Member
A. KOVEN, Member

FARR &
ASSOCIATES
REPORTING INC.

(416) 482-3277

2300 Yonge St., Suite 709, Toronto, Canada M4P 1E4

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Ontario

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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of an Order-in-Council
(O.C. 2449/87) authorizing the
Environmental Assessment Board to
administer a funding program, in
connection with the environmental
assessment hearing with respect to the
Timber Management Class
Environmental Assessment, and to
distribute funds to qualified
participants.

Hearing held at the Ramada Prince Arthur
Hotel, 17 North Cumberland St., Thunder
Bay, Ontario, on Wednesday, June 29th, 1988,
commencing at 11:30 a.m.

VOLUME XX

BEFORE:

MR. MICHAEL I. JEFFERY, Q.C.	Chairman
MR. ELIE MARTEL	Member
MRS. ANNE KOVEN	Member



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A P P E A R A N C E S

MR. V. FREIDIN)	MINISTRY OF NATURAL
MS. C. BLASTORAH)	RESOURCES
MS. K. MURPHY)	
MR. B. CAMPBELL)	MINISTRY OF ENVIRONMENT
MS. J. SEABORN)	
MR. R. TUER)	ONTARIO FOREST INDUSTRY
MR. R. COSMAN)	ASSOCIATION and ONTARIO
MS. E. CRONK)	LUMBER MANUFACTURING
MR. P.R. CASSIDY)	ASSOCIATION
MR. J. WILLIAMS	ONTARIO FEDERATION OF
	ANGLERS & HUNTERS
MR. D. HUNTER	NISHNAWBE-ASKI NATION
	and WINDIGO TRIBAL
	COUNCIL
MR. J.F. CASTRILLI)	
MS. M. SWENARCHUK)	FORESTS FOR TOMORROW
MR. R. LINDGREN)	
MR. P. SANFORD)	KIMBERLY-CLARK OF CANADA
MS. L. NICHOLLS)	LIMITED and SPRUCE FALLS
MR. D. WOOD)	POWER & PAPER COMPANY
MR. D. MacDONALD	ONTARIO FEDERATION OF
	LABOUR
MR. R. COTTON	BOISE CASCADE OF CANADA
	LTD.
MR. Y. GERVAIS)	ONTARIO TRAPPERS
MR. R. BARNES)	ASSOCIATION
MR. R. EDWARDS)	NORTHERN ONTARIO TOURIST
MR. B. McKERCHER)	OUTFITTERS ASSOCIATION
MR. L. GREENSPOON)	NORTHWATCH
MS. B. LLOYD)	

APPEARANCES: (Cont'd)

MR. J. W. ERICKSON)	RED LAKE-EAR FALLS JOINT
MR. B. BABCOCK)	MUNICIPAL COMMITTEE
MR. D. SCOTT)	NORTHWESTERN ONTARIO
MR. J.S. TAYLOR)	ASSOCIATED CHAMBERS OF COMMERCE
MR. J.W. HARBELL)	GREAT LAKES FOREST
MR. S.M. MAKUCH)	PRODUCTS
MR. J. EBBS	ONTARIO PROFESSIONAL FORESTERS ASSOCIATION
MR. D. KING	VENTURE TOURISM ASSOCIATION OF ONTARIO
MR. D. COLBORNE	GRAND COUNCIL TREATY #3
MR. R. REILLY	ONTARIO METIS & ABORIGINAL ASSOCIATION
MR. H. GRAHAM	CANADIAN INSTITUTE OF FORESTRY (CENTRAL ONTARIO SECTION)
MR. G.J. KINLIN	DEPARTMENT OF JUSTICE
MR. S.J. STEPINAC	MINISTRY OF NORTHERN DEVELOPMENT & MINES
MR. M. COATES	ONTARIO FORESTRY ASSOCIATION
MR. P. ODORIZZI	BEARDMORE-LAKE NIPIGON WATCHDOG SOCIETY
MR. R.L. AXFORD	CANADIAN ASSOCIATION OF SINGLE INDUSTRY TOWNS
MR. M.O. EDWARDS	FORT FRANCES CHAMBER OF COMMERCE
MR. P.D. McCUTCHEON	GEORGE NIXON

(iii)

APPEARANCES: (Cont'd)

MR. C. BRUNETTA

NORTHWESTERN ONTARIO
TOURISM ASSOCIATION

I N D E X O F P R O C E E D I N G S

<u>Witness:</u>	<u>Page No.</u>
<u>JOHN EDWARD OSBORN,</u> <u>KENNETH A. ARMSON, Resumed</u>	3462
Continued Direct Examination by Mr. Freidin	3462

I N D E X O F E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
89	Hand-drawn diagram produced by Dr. Osborn reflecting the three volume values: GTV, GMV, NMV.	3493
90	Hand-drawn diagram produced by Dr. Osborn.	3524
91	Metric table found at page 183 of Exhibit 78.	3539
92	Newsrelease dated June 9 by the Ministry of Natural Resources.	3591
93	Report entitled: An Assessment of Ontario's Forest Resources Inventory System and Recommendations for Its Improvements by R. Rosehart dated September, 1987.	3591

1 ---Upon commencing at 11:30 a.m.

2 THE CHAIRMAN: Good morning. Please be
3 seated.

4 Mr. Freidin?

5 JOHN EDWARD OSBORN,
6 KENNETH A. ARMSON, Resumed

7 CONTINUED DIRECT EXAMINATION BY MR. FREIDIN:

8 Q. Dr. Osborn, before we continue with
9 the discussion of stocking, I would just like to go
10 back to one part of your evidence yesterday.

11 Yesterday, in relation to Document No.
12 21, which is the Forest Inventory Procedure for
13 Ontario, which has the -- the third edition, 1978,
14 being Document 21, yesterday you indicated that how the
15 inventory is done in Ontario is described in that
16 particular document, and I understand that you wanted
17 to comment or qualify that statement.

18 DR. OSBORN: A. Yes. I made allusion to
19 this document or made reference to this document
20 yesterday. I used the reference in conjunction when I
21 was describing the field operational procedures, the
22 work with the prism and the height-measuring
23 instrument, and with reference to those field
24 procedures this document describes the sorts of
25 procedures practised today.

1 However, the comment, as I wish to go on
2 record, is the entire document does not describe the
3 entire process as currently practised today. There are
4 some changes that are done in today's processing that
5 are not exactly the same as indicated in that manual.

6 When I used the reference yesterday it
7 was with reference to the field part, but there are
8 other parts of the document particularly that say the
9 documentation, the reporting which was described
10 yesterday which do not follow the same format today as
11 that given in that manual of 1978.

12 Q. Dr. Osborn, when we left off
13 yesterday we were dealing with paragraph 46 of the
14 witness statement and, in particular, you had just
15 begun a description of the stocking figure in stand No.
16 102 which you will find at page 181 of the witness
17 statement.

18 Perhaps you could --

19 THE CHAIRMAN: Well, Mr. Freidin, I do
20 not know that it would it would be necessary to review
21 what evidence Dr. Osborn covered yesterday.

22 In other words, if you are going to
23 review, you know, the last part of his evidence at the
24 beginning of each succeeding day, I think perhaps we
25 could just go on with the new evidence.

1 MR. FREIDIN: I had no intention of doing
2 that, sir. I was just going to take him back to 102
3 where he started that last part for five minutes and
4 have him go from there.

5 THE CHAIRMAN: All right.

6 MR. FREIDIN: Q. You were describing
7 what stocking is and how it is determined and I believe
8 you were trying to do that in reference to stand 102;
9 is that correct?

10 DR. OSBORN: A. That's correct.

11 Q. And perhaps you could just start then
12 at page 181 with stand 102 and then proceed on to
13 describing that process and to do that you were
14 referring to Exhibit 88 as well.

15 A. Stand 102, the stand on the southern
16 corner of this road. 102: Black spruce 8, Pj1, Po2.
17 We were trying to describe how did we derive the value
18 of 1.2 in the fourth line, the fourth line reading
19 48-11-1.2, how did we get the value of 1.2 which is the
20 stocking value for that particular stand.

21 Q. The slide you just put up is the
22 first page of Exhibit 88?

23 A. That's correct, which is the metric
24 equivalent to page 203 in Exhibit 78. The stand
25 description said it was 48 years old and 11 metres

1 tall. So if we look at this particular diagram of
2 black spruce, height over age, and the age value is 48
3 and the height was 11 and we have confirmed what the
4 forest stand record said for height and age, we are in
5 the band of site class 1.

6 If we now turn to page 3 of Exhibit 88.

7 THE CHAIRMAN: Mr. Freidin, my Exhibit 88
8 seems to have disappeared overnight.

9 MR. FREIDIN: All right. We may have
10 another copy here of it. (handed)

11 THE CHAIRMAN: Thank you.

12 DR. OSBORN: Exhibit -- or page 3 on
13 Exhibit 88 is a table, a table from the yield tables,
14 it is a table for site class 1. As evidenced in the
15 title it is a table for black spruce, which is the
16 working group species we are looking at and the site
17 class we are looking at, and in stocking we are trying
18 to find the norm against which to compare the actual
19 basal area in this case.

20 Within that table there are a series of
21 columns: They range age, height, both average and the
22 range, diameter at breast height - which was alluded to
23 yesterday - the number of trees, the basal area per
24 hectare in square metres. This is a metric table.

25 The value we are looking for, the

1 normative value we are after is that given in the
2 column entitled basal area in metres squared. We have
3 a 48-year-old stand. If we come down the age column to
4 45, 50 - because there isn't a 48 value - and we read
5 across until we come to the basal area values, the
6 basal area normative would be 27.5 square metres, the
7 basal area in a 50-year-old stand would be 29.4.

8 Now, if we interpolate between 45 and 50,
9 the value at age 48 would approximate 28.6. So at age
10 48, for black spruce stands where its height and age
11 show them to be site class 1 on average in Ontario you
12 expect them to have 48.6 square metres per hectare
13 basal area.

14 MR. FREIDIN: Q. 28.6?

15 DR. OSBORN: A. 28 -- it is 28.6. The
16 particular stand in question, stand 102, has a sample
17 plot, a ground sample plot in it. We have indicated
18 that on the photograph and on the map with the bar.

19 Somebody actually went on the ground and
20 measured, as we described yesterday, on the 10
21 stations, the actual basal area per hectare. That
22 would have been recorded on the tally sheet.

23 Q. Page 164.

24 A. Thank you. On page 164 of the
25 evidence, Exhibit 78.

1 Page 164, we went through this tally
2 sheet briefly yesterday where we described how and
3 where we recorded the actual values measured when we
4 went through the bush and we actually recorded on the
5 back of the tally sheet, in the third box -- in the
6 third box there is a value saying total trees(85), and
7 on the line beneath that is a line that reads stocking,
8 actual basal area per hectare divided by normal basal
9 area per hectare.

10 For stand 102 that we are looking at on
11 the ground, on the ground plot, the tally sheet, they
12 would have recorded what the actual basal area per
13 hectare was they have found from the tally sheet --
14 found in the stand, recorded on the tally sheet.

15 So the actual value was recorded. They
16 know they are in a spruce site class 1 stand, they
17 evaluated that. They would look in the yield table for
18 at age 48 what was the normative value, which we have
19 evaluated as 28.6, the actual value divided by the
20 normal value would have given rise to the stocking 1.2,
21 which is the number recorded on the map sheet.

22 So where did the stocking 1.2 -- where
23 did this value of 1.2 in this line, stocking value,
24 come from: By taking the actual basal area found on
25 the plot and comparing it to the normative value from

1 the yield table for spruce, site class 1, age 48.

2 Q. And we don't have the tally sheet
3 which was actually prepared for 102 obviously?

4 A. This is back in Red Lake District, it
5 is their tally sheet, it goes back to the field
6 forester.

7 Q. So I understand that you work
8 backwards to figure out what the actual basal area
9 would have been to get to that 1.2?

10 A. The arithmetic would have
11 included -- would have concluded that if the stocking
12 was 1.2, the actual basal area from the plots would
13 have been 34.3, which if divided by 28.6 will give you
14 your 1.2 value.

15 Q. Now, Dr. Osborn, if you look at page
16 181 and you look to the right of stand 102 that we have
17 been looking at, go right over to the edge of the page,
18 there is a stand 114. Do you see that?

19 A. Stand 144 in the extreme right-hand
20 side of the map sheet.

21 Q. Now, am I correct that there is no
22 sample plot for that particular stand?

23 A. Correct. The fact that the map sheet
24 shows no bar, the fact that the age is given to the
25 nearest five years would indicate that this was a

1 photointerpretation sample rather than an actual
2 sample. But, although there is no guarantee of that,
3 this is an indicator, remembering 48 to the nearest
4 year in the actual sample, photointerpretation to the
5 nearest five years.

6 Q. So there is no bar in 114?

7 A. No bar in 114.

8 Q. All right. In that case where you
9 don't have a sample plot where you actually measured
10 basal area, how do you determine the stocking?

11 A. The areas where there are no ground
12 samples, as is evidenced by stand 114, the
13 photointerpreter will look at, in an aerial fashion,
14 down on top of the stand of the trees. So he or she is
15 looking at the photographs like the aircraft does down
16 on top of the trees.

17 The photointerpreter will estimate the
18 proportion of the stand that the trees canopy, crown,
19 foliage covers. So we are looking down on the
20 photograph, we are looking down on the top of the
21 trees, and the person is asking himself or herself:
22 How much of the ground can I see in proportion to the
23 total stand. How much of the tree canopy is covering
24 the entire stand.

25 If there is relatively few trees, you

1 could see a lot of the ground, if there is a large
2 number of trees very close together, you would see very
3 little, if any, of the ground.

4 Q. What would you do with that
5 information?

6 A. You would use that information in a
7 chart that is given on page 165 of the evidence in
8 Exhibit 78.

9 The chart on page 165, the shape of the
10 curve and the position of the values entered in that
11 chart in that curve on page 165, the values in there
12 came from all the ground samples taken in that
13 management unit for that particular working group
14 species.

15 So the chart on page 165 is called a
16 stocking density curve for the black spruce working
17 group, and the example on page 165 is for the Dryden
18 management unit. There would have been one produced
19 for the Red Lake management unit, which is the unit we
20 are look now looking at.

21 So when the inventory for Red Lake, this
22 unit we are looking at, was done there would have been
23 ground sample plots, the ground sample plot would have
24 estimated the actual stocking - I just described that
25 process - and at the same time, because the plots

1 marked on the photo, the photointerpreter could
2 estimate the ground closure, this canopy coverage of
3 the ground.

4 The photointerpreter now has: I look at
5 the crown closure, I have got a value .8, .7, 1, the
6 actual basal area, the actual stocking I derive to be
7 .6, .7, .8 the way we just described.

8 He plots those values on this curve, and
9 the little circles on the curve on page 165 are actual
10 ground observations: What was the stocking value,
11 crown closure.

12 So if you look at that curve, in the
13 bottom end of the curve and on the left-hand side of
14 the chart are stocking values, which is what we are
15 trying to derive, trying to get at the stocking for
16 this stand, the stocking value of close to .1 crosses
17 the crown density curve close to the 20.

18 The relationship between the stocking and
19 the crown density isn't the 101, it varies with species
20 and it varies with units.

21 So on this set of the samples that derive
22 this curve for this unit for this working group, we are
23 in a spruce stand, we look at the canopy, the
24 photointerpreters look to the canopy for this stand,
25 and counsel asked me what does he do when we sees it is

1 80 per cent, 90 per cent, 50 per cent crown canopy.

2 Whatever the value is, you look at in
3 this chart what is the crown density, crown canopy
4 value. I have got a value I read into this chart and,
5 for example, if I read in on that chart, by way of a
6 hypothetic example, 60 per cent crown density.

7 So on the scale across the bottom I am
8 looking at a 60 per cent crown density. If I go up
9 that until I cross the solid black line across the
10 chart, I come out to a value of stocking of .5.

11 I can see the crown density on the
12 photograph as the photointerpreter, I see the crown
13 density on every stand as the photointerpreter. I use
14 this chart to derive the relationship between crown
15 density and stocking found for this species in this
16 unit and I read off the stocking volume. And the
17 stocking value is recorded on the photograph and the
18 stocking value in this particular instance was .5.

19 Two methods of deriving stocking: Where
20 there is a plot, actual measurements, normative
21 measurement comparison; where there isn't a plot,
22 photointerpretation of canopy closure derived from the
23 graph in to the estimated stocking.

24 MR. FREIDIN: Mr. Chairman, I will just
25 ask for your direction. I could have Dr. Osborn review

1 one other stand to indicate how this is done, but I
2 don't want to be repetitive unless the Board feels that
3 it would like to have another stand, just go through
4 that process.

5 THE CHAIRMAN: I think, under the
6 circumstances, you better do one more example.

7 MR. FREIDIN: All right.

8 Q. Could we use -- let's use 101, that
9 one has a different working group species, I believe.
10 Is that correct, Dr. Osborn?

11 DR. OSBORN: A. Yes. Stand 101, which
12 is the stand immediately west or to the left of that
13 first stand 102 we looked at in the bend in the road,
14 so stand 101 is immediately adjacent to 102.

15 Q. And could you just go through the
16 description of the species composition slowly and
17 indicate where in fact it is recorded on that stand?

18 A. All right. So we are on page 181's
19 diagram or map, and stand 101 is immediately to the
20 west, immediately to the left of stand 102.

21 The species description for 101 reads:
22 Pj5, Po3, Sb2. The underlining of the Pj inferring
23 that is the working group species, in this case the
24 predominant species, 50 per cent of the stand is jack
25 pine.

1 Q. Pj is jack pine?

2 A. Pj is jack pine. 30 per cent is
3 poplar, Po; and 20 per cent is Sb or black spruce. The
4 stand description is somewhat different from the
5 adjacent area which was a predominantly black spruce
6 stand.

7 MR. FREIDIN: And if I just may, Mr.
8 Chairman. I referred you to Document 21 which is the
9 Forest Resources Procedure for Ontario and I had
10 referred you to page 12 of that document, unfortunately
11 I don't have the actual...

12 DR. OSBORN: Page 158 you are talking
13 about, the working groups?

14 MR. FREIDIN: Over the page where
15 somebody...

16 Page 159. I direct you to there where
17 you have this legend and just for perhaps your future
18 reference, if you go back one page to page 158, at the
19 bottom of the left-hand column, you actually have the
20 major species and the symbols that are used.

21 So if you happen to be looking at a map
22 and you wanted to find out what it was, you go back to
23 that page 158 and it describes most of the species I
24 think that would be recorded.

25 DR. OSBORN: Correct.

1 MR. FREIDIN: Q. So could you just sort
2 of pick up from there?

3 DR. OSBORN: A. Okay. Stand 101, jack
4 pine working group, species composition, the next line
5 reading 45-14-1.0: 45, 45 years old; 14, 14 metres in
6 height; 1.0, a stocking of 1.0.

7 Q. And the 45 for age is the age of the
8 working group species?

9 A. That is correct.

10 Q. And the 14, which is the height, is
11 the height of the working group species--

12 A. That is also correct.

13 Q. --in that stand. All right.

14 A. Just to confirm the record, the value
15 underneath was 2, site class 2 in our range of X, 1, 2,
16 3, 4. And the last value I believe is 12 which is the
17 area in hectares.

18 So we are looking at: How do we derive
19 the stocking which is given as 1.0, how was that value
20 derived in this particular stand.

21 Looking at this there is no bar in it,
22 there is no plot in here, so we have another example of
23 another working group of how do we derive the actual
24 value.

25 We would want to confirm in that stand --

1 if we go to page 6 of Exhibit 88. Page 6 of Exhibit
2 88 --

3 Q. That's an excerpt from the normal
4 yield table for jack pine; is it, Dr. Osborn?

5 A. That is correct, it is the metric
6 equivalent tables in the normal yield table. The stand
7 was 45 years old. This exhibit shows for jack pine,
8 which is the working group species, the height/age
9 relationships for site class.

10 So if we go in the bottom axis of that
11 particular diagram at age 45 and we read up that
12 vertical line until we reach 14 metres - which was the
13 height value for that stand - so at age 45 the stand
14 with 14 metres is on the curve or in a zone, you walk
15 along that zone to the right-hand side of the page,
16 indicates that it is site class 2.

17 So the height/age values in that stand
18 translate into a site class 2 stand.

19 Again, you will be looking for: How do
20 we derive the stocking, because there was no sample in
21 that stand, stand 101 there is no sample. Again, the
22 photointerpreter would look at the canopy, look at the
23 coverage of the trees looking down on those stands and
24 estimate how much of the area was in fact covered by
25 the canopy.

1 He would go again to a graph relating
2 stocking and ground density, only this time for jack
3 pine, based upon all the jack pine samples in that
4 unit, and read off the stocking value and the stocking
5 value that is recorded is 1.0.

6 So again, for an area with no actual
7 ground sample, we have a canopy coverage estimation
8 read off from a graph based on all the ground samples
9 of jack pine in that unit. What does that translate
10 into in stocking values.

11 Q. Now, could you turn to the page --
12 have you looked at page 8 of -- or could you turn to
13 page 8, I am sorry, of Exhibit 88. And at age 45,
14 which is the age we were looking at, you would have --
15 if you go across to where it says gross total volume
16 which is just off to the right, you have an indication
17 in that particular stand that the volume is 167.

18 A. Age 45, the value of 167 is the gross
19 total volume, cubic metres per hectare, this is a jack
20 pine stand remember we were in, the main stand, the
21 volume value at that age of 45 years, fully-stocked
22 stand based on provincial yield tables is 167 cubic
23 metres - metric table - per hectare.

24 Q. So if you look at stand 101, which
25 you have indicated has a 1.0 stocking for a stand which

1 has a working group of jack pine, would this page, page
2 8 of Exhibit 88, provide an estimate of the gross total
3 volume of that particular stand?

4 A. Yes. The volumetric value is based
5 upon some tables that are called normal yield tables
6 that presuppose or are estimates of what the values
7 would be for volume, for basal area, for number of
8 trees, all those other forest mensurational measures
9 for fully stocked conditions, a stocking of 1.0.

10 Q. And that is stocking for a hectare;
11 is it?

12 A. That is stocking on a -- the values
13 are for a per hectare basis.

14 Q. Yes, thank you.

15 A. To come to your question: Given the
16 stocking is 1.0, the volume value of the table of 167
17 would be multiplied by the stocking and, therefore,
18 because it is 1.0 in this case, will in fact not
19 change.

20 Had the stocking been something
21 different -- for example, the stocking we found on
22 stand 114 we previously described of .5 - again,
23 remembering the description of stocking was, if you got
24 few trees when you look down you would expect the
25 stocking to be low - the stocking of .5 would be

1 multiplied times the volume for that stand to estimate
2 the true volume on that area.

3 The tabular value for that stand
4 multiplied times the .5 to get the true estimate of
5 volume on that area. The stocking value is multiplied
6 times the volume out of the normal yield table.

7 Q. So if you took that page 8 then and
8 you looked back to stand 101, there is an indication in
9 the last number that it is 12 hectares?

10 A. Correct.

11 Q. So if you wanted the estimate then of
12 the gross total volume for that stand, would you
13 multiply the 12 hectares by the 167 cubic metres per
14 hectare that you have just referred to?

15 A. Yes, to get the total volume -- gross
16 total volume in cubic metres for the entire stand.

17 Q. Not just the working group species?

18 A. No, for all the species listed in
19 that stand.

20 Q. What is gross total volume?

21 MR. MARTEL: Could I ask a question
22 before you go on? You said all of the volumes in the
23 stand, but you have been measuring and dealing
24 primarily with this area poplar, right -- no, jack
25 pine?

1 MR. FREIDIN: Stand 101?

2 MR. MARTEL: Yes.

3 MR. FREIDIN: Yes.

4 MR. MARTEL: Stand 101 is primarily jack
5 pine, but you said the total volume per hectare
6 included all of the trees.

7 How do you translate that from dealing
8 with just poplar and assume that that includes all of
9 the trees that are there?

10 DR. OSBORN: Stand 101, as you rightfully
11 say, 50 per cent jack pine, 30 per cent poplar, 20 per
12 cent black spruce. The FRI procedure takes the
13 predominant working group species, age and height,
14 therefore site class, and therefore the volume table
15 look-up we have just shown. The volume table look-up
16 was for the working group species.

17 The assumption initially made in the
18 volume table look-up is that the stand is pure and this
19 is what I am hearing behind your question, how can you
20 do that when you have already demonstrated the stand
21 isn't pure.

22 All right. You have two alternatives and
23 the FRI does one of them, not the second. The FRI
24 takes and assumes that the volume of the predominant
25 species is important and is the most easiest to

1 estimate because it is the age and the height of the
2 predominant species that is on the table, so you can go
3 in for that one, for those values in the right table
4 and assume that most of the volume is correctly
5 estimated.

6 The use of the jack pine table to
7 estimate the volume of the poplar and the black spruce
8 could be an error and, depending upon the other species
9 and the amount of the other species, the error could be
10 large or small.

11 MR. MARTEL: Okay. Can you stop there
12 because jack pine -- poplar grow...

13 I guess what is confusing me is how you
14 can extrapolate that the 50 per cent jack pine can just
15 be turned over to the poplar willy-nilly and say it is
16 the same amount, because poplar grow much faster and
17 much larger in the same 45 years as jack pine will.

18 DR. OSBORN: You just hit upon the real
19 problem is: How can I estimate, how do I know what
20 table - I have got a volume table for poplar - how do I
21 know where to go into that poplar table when the only
22 age and height for that stand I have is the working
23 group species.

24 And the backup report could be: Why
25 don't you produce the age and the height value for all

1 the species in the stand. If you remember how we
2 conducted the ground cruise yesterday, very
3 deliberately, you only measure the ages and the heights
4 of the working group species, I did not tally the ages
5 and the heights of all the species.

6 And primarily it costs timing, that
7 operation, the age and the height take considerable
8 time, it is only done on three out of the 10 stations
9 on the whole ground sampling plot which constitutes 65
10 per cent of the total costs.

11 So I am running with a possible error by
12 having a procedure that is cheaper than doing every
13 tree, every age, every height. The more complicated
14 the stand - the example we chose was deliberate for
15 this reason - the greater the possible source of error
16 because of the use of the other -- the use of the
17 working group table, in this case jack pine, to
18 estimate the poplar and the black spruce.

19 The photointerpreter will have enormous
20 difficulty in estimating the height and the age of
21 those other species. So the bottom line is when you
22 use the volume estimates in the forest resource
23 inventory at the stand level, be well aware of the
24 potential sources of error.

25 And the source of error you just asked

1 about, Mr. Martel, is very real, understood, and the
2 user had that explained to them, that at that level of
3 a single stand's volumetric estimate this may be an
4 error.

5 MR. MARTEL: But if you put that across
6 the whole of the area of the inventory we are doing for
7 the whole of the EA, the size of the error could be
8 monumental.

9 I mean, if there is a chance of a
10 significant area on one site and you apply that error
11 factor right across the north, the chance of
12 significant error is quite monumental; isn't it?

13 DR. OSBORN: The way you have used the
14 words, yes, it could be, but let's remember that
15 some -- many of the stands are relatively pure,
16 particularly in the boreal, particularly in the north,
17 so that mixture that we very deliberately chose to
18 illustrate the point you are making isn't necessarily
19 across the whole of the north.

20 To come back to the rest of your example,
21 black spruce, poplar. In the jack pine stand you
22 rightfully said the poplar typically will grow faster
23 and bigger if it was the same age. The spruce,
24 however, because of the way it grows, in fact typically
25 will grow slower and smaller.

1 Does the compensation small error of the
2 spruce underestimate opposite the overestimate possibly
3 of the poplar? Your observation is very important and
4 we bend over backwards to make sure users are aware of
5 that at that level.

6 MR. FREIDIN: Q. All right. Let's
7 follow along on that example or that hypothetical, the
8 situation in stand 101 that was concerning or is
9 concerning Mr. Martel.

10 Is there anything that a forester might
11 do if they wanted to look at that stand and make some
12 sort of an estimate of the volume of the non-working
13 group species, poplar or black spruce, even though they
14 didn't have the height and the age measurements of
15 those particular species?

16 DR. OSBORN: A. Well, there is two
17 things immediately that can be done. The first is that
18 you can make - from local experience, knowledge -
19 estimates that if the jack pine in this case are site
20 class 2, 45 years old - if it is a site class 2 type of
21 stand for jack pine - what does that tell you about the
22 sort of stand it might be for poplar and black spruce
23 in this case.

24 Is site class 2 jack pine equivalent to
25 site class 1 poplar; is site class 2 jack pine

1 equivalent of site class 3 black spruce; and there are
2 field foresters, company and Crown, who will have
3 experience to make this sort of mental translation.

4 That is one option. And you then go into
5 the appropriate poplar, black spruce table to work up
6 your estimate for the two-tenths spruce, the
7 three-tenths poplar, the five-tenths jack pine.

8 MR. MARTEL: They actually do that then?

9 DR. OSBORN: People can do that, and I
10 can think of one company I know computer processes this
11 way round.

12 Still an inherent difficulty, because
13 exactly does site class 2 jack pine translate into site
14 class 1 spruce. It is a real variable.

15 The second method available, particularly
16 for dealing with one stand, we would go in and do
17 another form of assessment - which we will come to
18 later called an operational cruise - particularly for
19 those areas where we have just based it upon
20 photointerpretation.

21 If you really want to know what is out
22 there, you have another -- you have a series of, but
23 the most obvious estimating procedure is some more
24 intensive form of cruising. And there will be a
25 greater explanation of that process, its uses and its

1 limitations towards the end of the section to do with
2 the forest inventory.

3 MR. FREIDIN: Q. And, Dr. Osborn, this
4 particular stand is in Red Lake management unit which,
5 I understand, is part of the boreal forest?

6 DR. OSBORN: A. Correct.

7 Q. Having measured the age of the
8 working group species, in this case jack pine, at being
9 45 years of age, is there any reasonable conclusion or
10 estimate that a forester could make as to the age of
11 the other two species which make up the stand in that
12 case -- in this case, the poplar and the black spruce?

13 A. Yes. As was evidenced two days ago
14 when we actually showed the area volume distributions
15 for jack pine in the Red Lake unit, one of the
16 disturbing factors, if you like, was the large area of
17 barren and scattered as caused by a fire.

18 Some parts of the boreal, Red Lake being
19 perhaps particular, many of the origin of the stands
20 are fire origin. The fire comes through, things get
21 burnt, things regrow. The jack pine are 45 years old.

22 The black spruce and the poplar are
23 unlikely, given a fire origin, to be older. The black
24 spruce and the poplar in this case could be the same
25 age, 45, quite likely, particularly the poplar, pioneer

1 species in first. So we could make an estimate that
2 way from silvicultural knowledge of what might be the
3 age of the poplar.

4 Black spruce may come in the same time,
5 may come in slightly later. Black spruce age, 45 or
6 maybe younger.

7 So there is a variety of, what I will
8 call, local knowledge that can be used to supplement if
9 we are really looking for that source of error and how
10 can we alleviate part of it.

11 THE CHAIRMAN: Dr. Osborn, what is in
12 percentage terms the error factors that are usually
13 bandied about with respect to this kind of stand
14 information, plus or minus?

15 DR. OSBORN: Very hard, Mr. Chairman, in
16 a way to sort of think of what the numbers might be
17 because the numbers could range from zero, in the sense
18 that your estimate is pretty on the bull, to
19 potentially maybe a hundred per cent in error. This is
20 sort of flying off the wall because the possible range
21 of errors, if you think of a stand that could be
22 one-tenth of all 10 species.

23 Now, inherently a real difficulty - and I
24 make no bones about it in the FRI the complex stands -
25 that is very hard with every single one of 10 species

1 being one-tenth, which one do you use and the species
2 in the yield tables vary.

3 So the error could be large. Now,
4 putting a number on it, sir, doesn't really -- I can't
5 pull one out and I don't have any evidence to sort of
6 show.

7 THE CHAIRMAN: Have they ever tried the
8 methodology on a stand where you know exactly what is
9 there because you planted it - say, a plantation type
10 stand - and then have foresters come in and use this
11 methodology and see just how accurate they are?

12 In other words, you have an absolute
13 check.

14 DR. OSBORN: But you would have to do
15 more than that which you just described. It is not the
16 planting that gives you concern, it is the cutting of
17 them down. How do you get the real volume? The only
18 way to get the real volume is to cut them all down,
19 take off the bark, put them in a tank and displace
20 water. Now, that has been done, not in Ontario, but
21 it's certainly been done in Maine, you get the volume
22 by displacement.

23 Let's go -- let's back off one more
24 practical step, let's cut them all down, measure the
25 diameters, break them up into logs, measure the length,

1 could be done, as you can imagine a very destructive
2 and expensive type operation.

3 Within Ontario, I do not know of any
4 experiments to literally take 1, 2, 3, 4, 5 hectares,
5 estimate what is there through any mechanism, cut them
6 all down and actually carefully measure them. In all
7 honesty, that would be the only way of a true
8 volumetric estimate.

9 THE CHAIRMAN: Okay.

10 MR. MARTEL: Could we get a better
11 estimate if we spent a little more money in the process
12 to get a much - I am not sure, you said cheaper -
13 wouldn't it be to our advantage to spend a little more
14 to get a more precise knowledge of what we have?

15 DR. OSBORN: I will speak later to that,
16 Mr. Martel, but as a one-liner right now, there is a
17 tradeoff. The more money you spend, the more precise
18 the estimate, given you do it right and given you apply
19 the right sort of techniques, given you know exactly
20 what you are doing when you spend that little bit more
21 money you alluded to.

22 Because you could spend a little bit more
23 money and still be no wiser, but given that you do use
24 the money wisely - and I will come to that later what I
25 really mean by that - is that worth being that much

1 more precise? How much can you afford to spend to
2 increase that precision? What do you forego, what do
3 you lose if you have the error you earlier alluded to?

4 How many people have gone out of business
5 because the volume was plus or minus five per cent or
6 10 per cent or 15 per cent? How much increased
7 precision, accuracy do we need?

8 Your suggestion is very valid, it has
9 been considered. It really is a tradeoff between what
10 we spend versus what we get for it. Later in the
11 evidence we will talk of another method that estimates
12 what is on the ground that is more expensive and, if it
13 is done properly, is more precise.

14 So I will come to this in much more
15 length, but you are leading up to where I am coming to,
16 sir.

17 MR. FREIDIN: Q. Looking then back at
18 page 8 of Exhibit 88 for the gross total volume for
19 that fully-stocked stand, could you explain to the
20 Board what gross total volume means?

21 Are you looking for the flip chart?

22 DR. OSBORN: A. Yes, that is what I am
23 looking for.

24 Mr. Chairman, I was asking for a flip
25 chart because I am going to draw a relatively crude

1 diagram to illustrate this particular point.

2 As an introductory set of remarks, I am
3 going to describe three kinds of volume, and the three
4 kinds of volume are gross total, the second kind of
5 volume is gross merchantable, and the third category of
6 volume is net merchantable.

7 Q. And each of those, I understand, has
8 certain symbols, so we have a short form; am I correct?

9 You are not going to answer me, Dr.
10 Osborn?

11 A. Yes, I will answer you yet. The
12 total from the tip of the tree to the ground is called
13 gross total volume, and the foresters will bandy around
14 the expression GTV. And it was the gross total volume
15 values that we read out of the yield table when we were
16 describing the 167 cubic metres per hectare for all the
17 jack pine stands, GTV.

18 Gross merchantable volume, as the title
19 would infer, is that part of the tree that is
20 merchantable according to today's technology and so the
21 stump is not included because most trees are cut, not
22 at ground level but slightly higher at stump height.

23 Similarly, the top of the tree, the tip
24 is not included in gross merchantable. Again,
25 primarily because there is the massive branches up here

1 and very small diameters, the processing for saw logs,
2 for veneer obviously is impractical and even for some
3 pulping processes in the extreme tip of the tree.

4 So the definition of gross merchantable
5 is from a particular top diameter limit and a stump
6 height value, gross merchantable.

7 Because trees have defect, they have rot
8 in them, there is allowances made to subtract from the
9 gross merchantable value -- the gross merchantable
10 volume values the amount of defect which might be a
11 hole or rotten wood which would collapse under the saw
12 or warp, peel, or isn't there to be pulped.

13 And so net merchantable is, in fact, the
14 gross merchantable netted down to the actual sodded
15 wood left between the stump and the top -- the tip of
16 the tree.

17 So we have three values of volume: GTV,
18 GMV and NMV. And it is important when we are talking
19 forest mensuration, forest management, that we are
20 aware of which volumetric value we are talking.

21 The yield tables said there was 267 --
22 167 cubic metres per hectare GTV, tip of the tree down
23 to ground level.

24 THE CHAIRMAN: Do you want to mark that
25 Exhibit 89, please.

2

3

11

15

19

1 110 is the volume if you take off the
2 tops and you leave a stump. The FRI will present
3 estimates, GTV, and gross merchantable volume. This
4 starts to bring in the idea or the concept of
5 utilization.

6 MR. MARTEL: Could I ask a question again
7 then because there is one other factor then, that while
8 you get 167 and your gross merchantable is 110, is
9 there a similar chart which would kind of guesstimate
10 how much of that would boil down to net merchantable?

11 DR. OSBORN: The answer about two years
12 ago used to be no for the strong reason that the FRI
13 really was not designed, never intended to be used at a
14 stand-by-stand level and, therefore, providing what is
15 a stand-by-stand estimate is almost an inference if you
16 give me the answer, you expect me to use it at that
17 level, and the FRI was never designed for that.

18 So until very recently there was no net
19 merchantable estimate because to do what you are asking
20 about is how much defect, how much cull is there on
21 that stand in that -- now that is very hard, if you
22 remember we are dealing with photointerpretation.

23 However, there are a set of tables for
24 the province describing on average, by species, by age,
25 the cull, the defect. So for jack pine, as the stands

1 get older the amount of defect can increase.

2 MR. FREIDIN: Q. And cull is spelled
3 c-u-l-l?

4 DR. OSBORN: A. Yes. So to continue Mr.
5 Martel's question, there is a provincial set of tables
6 that if the local manager felt that appropriate to use
7 could be applied, jack pine stand, age 45, read off the
8 table, average defect 3 per cent, 4 per cent, whatever
9 the value in the table might be. They are a
10 province-wide set of cull tables.

11 However, in Red Lake, which is where these
12 data came from, the local forester would have had some
13 knowledge from watching the wood be utilized, watch it
14 being scaled, watch it being processed in the mill,
15 what the local jack pine defect and cull may be. And,
16 in fact, in the wood measurement procedures called
17 scaling that is provided, it is estimated. So really
18 all the unit forester in Red Lake has got to do is turn
19 to his scaling person.

20 In jack pine, given that these trees are
21 being cut at age 45, what sort of defect am I having?
22 Is it different from the provincial average?

23 Now, again, stressing that the FRI was
24 not meant as an estimate at the stand level, which is
25 what we are talking about, that still could be done

1 with all the attendant uncertainties and risks of
2 understanding how the volume was produced, it was an
3 estimate, it has got that complexity of species
4 composition.

5 We have now talked about a defect value
6 that may or may not be applicable to this particular
7 stand of trees - although it is true of the whole of
8 Red Lake - so what you asked for can be estimated, but
9 the more and more you go in this direction it is more
10 and more user beware.

11 Q. Why is that?

12 A. Because the number of errors are
13 increasing and increasing, the sources of uncertainty
14 are increasing and increasing as you go more and more
15 to a refined estimate of the net merchantable volume on
16 that particular stand using the FRI set of procedures.

17 Again, the alternative way of looking at
18 this and measuring this - a set of procedures called
19 operational cruising - will be explained later which
20 does provide for such an estimate, again, still an
21 estimate.

22 If we come back to the Chairman's earlier
23 question: How would we really know what the net
24 merchantable value is. Here, it is not a matter of
25 cutting down all the trees and putting them in a tank

1 of water, you have got to cut them all up in small
2 pieces because there is holes and defect you won't see
3 unless you cut up the tree. This is a further
4 complication. Trees unfortunately grow in irregular
5 shapes with all sorts of holes in them. To estimate
6 the volume is always an estimate.

7 THE CHAIRMAN: Dr. Osborn, what is the
8 present purpose, as understood by the Ministry, for the
9 FRI today?

10 DR. OSBORN: The basic data, sir, and I
11 think it is given in paragraph 30 on page 26. In
12 paragraph 30 on page 26 it states essentially these
13 data are for timber management purposes and timber
14 management planning is done on a management unit basis,
15 the data are to be applied from a planning perspective
16 at the management unit level.

17 Now, what we have done in the last half
18 an hour is go through how the stand data statistics are
19 derived, so there is an understanding of how to read
20 the forest stand map, what is behind it, and the
21 processes to so do.

22 However, with the complete understanding
23 that those data are to be used on a planning
24 environment at the management unit level and several
25 references have been made as to the dangers of using

1 these data as a stand-by-stand operational estimate.

2 MR. FREIDIN: Q. Just one more stand I
3 would like to refer to on page 181 before we leave.

4 Stand No. 96, which is near the bottom,
5 just to the right of centre of the portion of the stand
6 map, and that particular stand, Dr. Osborn, could you
7 just quickly describe that stand?

8 DR. OSBORN: A. Stand 96 has as a label
9 96, the stand number, Sb underlined, no numeral, no
10 other species, B-S, which was the shorthand we
11 described yesterday for barren and scattered, 2 as the
12 site class value and 47 as the area in hectares.

13 Q. And my question in relation to that
14 stand, Dr. Osborn, is: How or why -- and why does that
15 stand have a working group species attributed to do
16 when in fact it is barren and scattered?

17 A. The photointerpreter would have
18 derived that information from one or two possible
19 sources and this was, in a way, an earlier question of
20 Ms. Koven's.

21 One of the two sources was the previous
22 FRI for this area showed - and the photointerpreter
23 would have looked at that - that this was previously a
24 black spruce stand that has since been cut, burnt
25 and/or died. So the previous history on this site said

1 black spruce was growing here. On this area I will
2 assume at this point in time, until evidence shows
3 otherwise, that I will label it black spruce.

4 The other source of information is a
5 provision of evidence, if you like, from the local
6 forester that this was black spruce, his or her records
7 show it was black spruce and the local forester's
8 intention is to manage it on black spruce.

9 So either from local forestry knowledge
10 and/or past inventory records, it was or is to be black
11 spruce.

12 It is barren and scattered, so the fact
13 that it is labeled black spruce at the moment is a
14 matter more of convenience because when something is
15 done to it and it's found to be successful and growing,
16 whatever species are found on there will cause that
17 label to change to what is then found. So there is a
18 reference back really to the history in labeling barren
19 and scattered stands.

20 Q. And when it is identified as barren
21 and scattered, is there any volume estimate attributed
22 to it?

23 A. There is no volume, there is no age,
24 there is no stocking, there is no -- just to pursue
25 into what will be presented in evidence tomorrow, that

1 47 hectare stand is not entered into the base or the
2 subsequent next term planning yield regulation value.
3 It does not enter into the base for the calculated
4 value.

5 Q. And we will come back to that when we
6 get into yield regulation.

7 Now, Dr. Osborn, in Exhibit 88, if we go
8 to page 10 and this is really the fourth page, the
9 fourth last page, we find a normal yield table for red
10 pine; is that correct?

11 A. That is correct.

12 Q. And the following pages, 11 through
13 13, also deal with red pine?

14 A. That is correct.

15 Q. Why did you include the normal yield
16 tables for red pine -- the yield tables for red pine in
17 Exhibit 88?

18 A. I suppose for a variety of reasons,
19 but one of them related to some interrogatories that
20 were received that asked us why did we think or what
21 evidence did we have that silviculture in fact was
22 going to lead to greater growth rates, greater
23 productivity than had occurred previously in the past
24 with nature.

25 And if you compare pages 10 and 12 in

1 that exhibit, on page 10 we have the height, age curve
2 for red pine, and this is based upon natural stands,
3 unmanaged stands, and the curve on page 12 of Exhibit
4 88, which is entitled Red Pine Planted and Moderately
5 Thinned, here we have a curve describing the height,
6 age, growth of planted red pine.

7 Just to indicate something - and we will
8 come back to more detail about that - on page 10 at age
9 20, which is the bottom left-hand corner of that page
10 10, if we go up the height curve, and we will take as
11 an example a value that is at age 20, nine metres tall.

12 So we have a stand on the normal red pine
13 on page 10 that is 20 years old, nine metres tall and
14 that is sitting on the black solid line that is a curve
15 described as site class 1. And we are going to
16 essentially compare this stand from age 20 to age 60
17 with what did the planting and thinned stand, going
18 from age 20 to age 60, look like that was comparable at
19 age 20.

20 So on page 10, we have got a stand
21 20-years-old, nine metres tall, sitting on the site
22 class 1 curve, that if you go up that curve of site
23 class 1 until the trees would be 60 years old, they
24 have an estimated height of about 20.2, 20.3 metres.

25 Now, we are going to compare that sort of

1 progression with the comparable type of stand on page
2 12. If you go to page 12, which is for the red pine
3 planted and moderately thinned at age 20, the solid
4 black line crosses the high axis at approximately nine
5 metres. So at page 20 the planted stand and the
6 natural stand are approximately the same average
7 height.

8 If we progress on page 12 up the solid
9 black line, the stands grow according to that
10 particular development curve, by age 60 the stand
11 height for red pine planted and moderately thinned is
12 approximately, 23, 23.6, 23.7 metres as opposed to our
13 20.3 metres. The planted trees over that 40-year
14 period have grown faster in height.

15 Q. The difference is approximately three
16 metres?

17 A. The difference is approximately three
18 metres over that 20-year period. So in terms of height
19 growth, natural stand, planted stand, same age,
20 approximately the same height at that age, over the
21 next 40 years different height development. The
22 planted stand having grown faster than the natural
23 stand.

24 THE CHAIRMAN: Are you basing the
25 figures, say, on page 13 on estimated growth? I mean,

1 have you been practising these silvicultural practices
2 for the last 65 years? I mean, how do you know exactly
3 how you are going to end up, maybe it will slow down in
4 the later years rather than progressing as you have
5 estimated.

6 DR. OSBORNE: Mr. Chairman, these
7 particular species, red pine, was in fact chosen
8 deliberately because these data are based upon actual
9 growth and yield measurement plots. The red pine
10 plantations in, particularly, southern Ontario have in
11 fact been planted, looked after, tended and grown since
12 just after the end of the first world war.

13 So within red pine there are actual
14 permanent growth and yield plots, and it's those actual
15 permanent growth and yield plots that have given rise
16 to these data for the planted moderately thinned.

17 So we have evidence on pages 13 -- 12 and
18 13 that are based upon actual measurements to sort of
19 partly answer the question you asked. And their
20 inclusion was deliberately for this reason, in southern
21 Ontario, with this species, the longevity of the
22 practices and the measurements let us make this sort of
23 comparison.

24 THE CHAIRMAN: Would the practices not
25 have changed over the 65 years?

1 DR. OSBORN: Yes, sir. And, if anything,
2 evidence in silviculture in the world infers that they
3 may have got better. We are making no comment and
4 projection on that in Ontario per se, but from the
5 existing evidence planted thinned red pine has grown in
6 height, as I have just shown, better than natural red
7 pine. And there are a whole host of factors as to why
8 they are common.

9 MR. FREIDIN: Q. I am just wondering
10 whether, if we just follow that line of questioning
11 before we go back to those tables, what is available in
12 Ontario regarding other species in the area of the
13 undertaking in relation to the type of yield table that
14 has been developed for planted red pine?

15 DR. OSBORN: A. There is really two
16 answers to this question. In parts of southern
17 Ontario, but still in the area of the undertaking,
18 there have been for some time series of permanent
19 sample plots to do particularly with hard maple. Now,
20 admittedly not necessarily planted, but managed as
21 opposed to natural.

22 So within the hard maple, which is the
23 southern part of the undertaking, there is some
24 evidence, although not tabulated in this format, of
25 growth rates, natural growth rates managed, gradual

1 progression, not a lot of permanent sample plots but
2 some.

3 Within the boreal, within the jack pine,
4 balsam, black spruce, the silviculture, the planting
5 has really not been going on for much more than 20, 25
6 years as described by Mr. Armson. So there isn't very
7 long-term records in the north of what has happened
8 with seeded and planted areas that are artificially
9 created. And I will bring your attention to the fact
10 that on pages 10 and 11, particularly for the natural
11 stands, the tables start at age 20.

12 Q. If I just might, Dr. Osborn, you made
13 a reference when you referred to the hard maple that
14 those stands were not planted but they were managed.

15 What sort of activities, just briefly,
16 would qualify as indicating that they were managed?

17 A. Well, we would have regenerated them
18 and we would have subsequently looked after them;
19 tended, thinned, manipulated the density stocking of
20 the trees, the arrangement of the trees, the numbers of
21 the trees in such a way similar to the word thinned in
22 the red pine table, we would manipulate that stocking
23 and density, that arrangement of the trees to
24 facilitate growth.

25 So they would have been -- the word

1 manipulate has some nasty connotations, but it is meant
2 in a positive sense.

3 Q. In that answer you said that "we
4 would have regenerated those trees". What do you mean
5 by that?

6 A. We would have cut them and we would
7 have cut them in such a way to facilitate the
8 regeneration came back successfully.

9 Q. But not planted or seeded?

10 A. Not in the terms of hard maple.

11 Q. Okay. Mr. Armson, in relation to the
12 length of time that silviculture has been practised in
13 the boreal referred to by Dr. Osborn, the picture that
14 you showed or the slide that you showed which indicated
15 site preparation being done by pulling a rock behind a
16 tractor, do you remember the year of that particular
17 picture?

18 MR. ARMSON: A. Yes, I believe that year
19 was 1961 that the photograph was taken.

20 Q. Thank you. Dr. Osborn, I believe you
21 had indicated that the managed stand had grown more
22 quickly and are you able to advise whether -- what the
23 volume difference, if any, is when you compare the two
24 types of stand?

25 DR. OSBORN: A. If we come to pages 11

1 and 13 in Exhibit 88, and page 11 is the tabular value
2 for the natural red pine for site class 1, and site
3 class 1 where our example of our 20-year-old tree, nine
4 metres tall was on, it was on the site class 1 curve.

5 Q. I am sorry, which page, Dr. Osborn?

6 A. Page 11 of Exhibit 88.

7 Q. Thank you.

8 A. So page 11 is a tabulation for red
9 pine, site class 1, similar sort of yield tables we
10 have evidenced and seen with the jack pine and the
11 spruce and we have a stand of age 20 that we said was
12 nine metres, the actual value in the table is 8.9, and
13 that stand has some other paramaters of basal area and
14 volume.

15 We were going to walk that stand up to
16 and see what happened in comparison at age 60. So for
17 our site class 1 natural red pine, if we look at the
18 line that is age 60, and at age 60 the height average
19 in metres in the table was 20.5, which is approximately
20 what we estimated off the graph before, then this shows
21 a range of heights which really are the upper and lower
22 limits of the site class 1 range.

23 The next value it comes to is a basal
24 area of 41.4 and I will go through the values for the
25 natural red pine first and we'll come back and make

1 comparisons with the planted. So on page 11, still in
2 the natural red pine stand, the volume gross total was
3 391; the CAI, current annual increment, that measure of
4 how well am I growing this year, is 3.6; and the last
5 but one column shows a gross merchantable volume of
6 333. So our 60-year-old has got 391 gross total, 333
7 gross merchantable, natural stand, age 60.

8 Page 13 let's us compare. And if we
9 start at age 20, just to make sure we are more or less
10 in the same track, at age 20 our red pine planted trees
11 on page 13 at age 20, average height 8.7, average basal
12 area 31.8, higher than the natural; northern atypical
13 condition, when you plant them you tend to make the
14 wisest use or the best use of the entire area as
15 opposed to nature; the gross total volume at age 20 was
16 116 in comparison to 109 for the natural. Not too
17 dissimilar.

18 We take our planted trees up to age 60.
19 At age 60 for the red pine planted the height was 23.6,
20 as previously described, approximately a three metre
21 difference; at basal area was 41.1, virtually the same
22 as the natural stand.

23 And, in fact, basal area is often a
24 measure used by people in thinning to try and keep a
25 level of basal area most desirable for the growth rate

1 of the remaining trees. In fact, many thinning regimes
2 use basal area as a guide. The basal area is the same,
3 planted versus natural. But the volume value is 319
4 natural and 475 in the planted, the volume was larger.
5 The growth rate in CAI is 4.4 as opposed to 3.6, the
6 growth rate is higher at this point in time.

7 The gross merchantable value was 426 as
8 opposed to 333. The difference in gross total is
9 approximately 80 cubic metres. The difference in gross
10 merchantable is 90 or more. So in a merchantable
11 volume sense, it is merchantable volume really that we
12 stick in through the mill, we are better off in volume
13 in the planted environment.

14 So to come back to the initial question,
15 the silviculture, does forest management do anything
16 for you, what is the evidence for that. Within red
17 pine in Ontario the documentary evidence, as just
18 explained, indicates the sort of differences that may
19 be achieved.

20 THE CHAIRMAN: Mr. Freidin, this may be a
21 convenient place to take the lunch break.

22 MR. FREIDIN: Yes, it would be. I just
23 have two more questions on this exhibit, but I think we
24 can deal with that after lunch. It may take longer
25 than five minutes.

1 THE CHAIRMAN: All right. We will break
2 until 2:15 at this time.

3 Thank you.

4 ---Luncheon recess at 1:00 p.m.

5 ---upon resuming at 2:25 p.m.

6 THE CHAIRMAN: Thank you, ladies and
7 gentlemen. I apologize for the delay.

8 MR. FREIDIN: Q. Dr. Osborn, we were
9 looking at Exhibit 88 and dealing with the yield tables
10 that are contained therein for red pine, and one of
11 them was a yield table for an area which had been
12 planted and thinned.

13 Can you advise, has the Ministry of
14 Natural Resources done anything to obtain the type of
15 information regarding species in the area of the
16 undertaking similar to what you have shown for red
17 pine?

18 DR. OSBORN: A. Yes, there has been, and
19 there have been over the last I suppose five to ten
20 years a slow progression, slow establishment of a
21 number of plots - most of which were to be permanent
22 sample plots - placed in particularly young planted
23 areas, particularly conifers in the area of the
24 undertaking, and that was a study that was started by
25 the previous mensurationist out of main office.

1 That series of plots in turn have been
2 built upon and such a study has been augmented with
3 some of the studies recently undertaken that was --
4 studies were spoken to by Mr. Armson under the heading
5 of SAWS I believe. If I am in error in that was what
6 Mr. Armson spoke about, it will be spoken about in
7 Panel No. 4 when Mr. Armson will then speak about it.

8 Q. All right. I think the latter is
9 correct.

10 A. So this study that will be explained
11 in Panel 4 described - I'll get it straight soon -
12 described the series of plots that have been put in and
13 the measurements that have been taken and there will be
14 a review of where that study is in relation to the sort
15 of data comparable to that which is given on pages 12
16 and 13 in Exhibit 88.

17 Q. And if you could just take a look at
18 Exhibit 88, Dr. Osborn, and go to the red pine -- I
19 guess this will be at page 11, actually look at 10 or
20 11, can you tell me: Is there any special reason why
21 the red pine yield table there starts at age 20?

22 A. Yes, and it is perhaps easier to
23 understand if in fact you look at page 11.

24 There are two main reasons. The first is
25 that it takes some time in the early starting of any

1 set of trees to settle in or settle down, so to speak,
2 and so as far as the height measurement is concerned,
3 particularly the height as an indicator of the site
4 class, in the early years that tends to fluctuate for a
5 variety of historic circumstances and, after a period
6 of time, the stand becomes in a way more reconciled to
7 the site such that the height measure then becomes a
8 relatively good indicator.

9 Now, the second reason which in a way is
10 more pragmatic is shown that until the trees reach a
11 certain size their volume is small if not
12 insignificant, particularly their gross merchantable
13 volume and that is perhaps particularly evident or
14 particularly obvious, if you like, if in fact you look
15 at page 13 because in page 13 you see the values for
16 the red pine planted, the table for red pine planted,
17 growing ages 5, 10, 15 and 20 and on that particular
18 table on page 13 both the basal area value and the
19 volume value are either small or non-existent up to age
20 20.

21 So most yield tables, certainly in the
22 northern temperate part of the world, tend to start at
23 a certain specific age.

24 Q. Dr. Osborn, would you take out your
25 copy of Exhibit 84, please and would you also have in

1 front of you page 181 of the witness statement. 84 is
2 the photograph, the aerial photograph.

3 Do you have that?

4 A. Yes, I do.

5 Q. And in Exhibit 84 in the photograph,
6 could you tell me what the site class is for stand 101?

7 A. Stand 101 just to bring the peoples'
8 attention to exactly where this particular stand of
9 jack pine, just past the lefthand side of the bend in
10 the road, stand 101, which is the location. On the
11 photograph the site class reads 3.

12 Q. Now, could you just stop for the
13 moment. The same designation -- we had the same
14 letters on Exhibit 84 in the location of stand 101 as
15 it is shown on page 181, but there is no stand
16 delineation or stand number 101 in the same place on
17 Exhibit 84.

18 A. No, because when the
19 photointerpretation is done the stands are not numbered
20 at that time.

21 Q. All right. So...

22 A. So this is really why I was referring
23 to the map sheet to give people some knowledge and
24 geography on the photo exactly what part of the photo
25 we were looking at.

1 Photographs do not have stand numbers on
2 them, not until the compilation is done, the number
3 gets added.

4 Q. But is the site class for stand 101
5 shown, or what became 101, shown on Exhibit No. 84?

6 A. Yes.

7 Q. And it is what site class?

8 A. It is 3.

9 Q. Would you look at Document 28 or page
10 181 of the witness statement. What is the site class
11 for stand 101?

12 A. It is 2.

13 Q. Is this an easy type of difference to
14 detect, Dr. Osborn? First of all, could you explain
15 the difference?

16 A. When the photointerpreter looked at
17 the photograph, Exhibit 84, the photointerpreter
18 estimated the height and the age, the photointerpreter
19 went into the height/age site class curve and estimated
20 from that height and that age what he or she thought
21 the site class was and wrote down the number 3 on the
22 photograph, as exhibited -- as shown on Document 84.

23 In the compilation process, that
24 photographic stand boundary and description is
25 transferred on to the draft forest stand map. I

1 mentioned in the description of how those data are
2 taken through the compilation process, they are then
3 entered into a computer to end up to produce the
4 results.

5 And so for stand 101 the person doing the
6 compilation would have entered the stand number and the
7 stand description, including the height and the age,
8 and the piece of computer software would have gone,
9 exactly the same as the photointerpreter did, to look
10 up in a table for that height and that age what was the
11 site class.

12 Only the computer software was somewhat
13 less fallible than the photointerpreter. There are
14 rules and regulations built into the software code
15 enabling that error -- that human error in the
16 photointerpreters to in fact be caught and corrected
17 because, in fact, the value on the map on page 181,
18 site class 2, is the right value as we saw sometime
19 earlier this morning when we went into jack pine site
20 class 2 table for that height and that age and we found
21 we were in site class 2.

22 In fact I went through that deliberately
23 indicating that I didn't necessarily trust what I saw,
24 let's make sure I check. So the message in this
25 essence is, first approximation was caught in a

1 subsequent check and, in fact, the corrected answer is
2 placed on the map sheet and in the record.

3 Q. Dr. Osborn, I would just like to go
4 back, for a moment, to your evidence in relation to the
5 forest resources inventory and, in particular, the
6 evidence you gave about ground sampling where people
7 went out in the field and took measurements at certain
8 plots in relation to that process.

9 If you did what Mr. Martel was suggesting
10 when you go out on one of those excursions, and by
11 doing what Mr. Martel suggested, I mean that you would
12 measure the height and the age of each tree in the
13 plot - and that means regardless of species, every
14 species, not just the working group - if you did that,
15 what effect would the results have, if any, on your
16 ability to more precisely estimate the volumes of the
17 various species in the stand which was sampled and in
18 the stands other than the one which was sampled?

19 A. Okay. There is a three-part answer
20 in essence to this question. The first answer is the
21 degree of pragmatism. I mentioned when I described
22 this process that there was 10 stations, on each and
23 every station we counted the number of trees, on
24 station 3, 6 and 10 we actually measured the height and
25 the age of the working group species.

1 At this point in time, on average, an FRI
2 stand plot takes, from start to finish on the plot not
3 counting your travel time, approximately 40 minutes to
4 cover the 10 stations.

5 Q. How many...?

6 A. 40 minutes, four zero minutes. So to
7 cover the 10 stations takes 40 minutes.

8 Now, I haven't done a time and motion
9 study, but let's assume it takes approximately a minute
10 to sweep at each station and a minute to walk between
11 the stations. With 10 of those, we have got 20 minutes
12 gone out of our 40 minutes. It means it is taking
13 approximately 20 minutes to measure the heights and the
14 ages of the three trees, which is not unreal because
15 measuring the height and the age is quite a
16 time-consuming process.

17 So without a time and motion study these
18 approximations, certainly the 40 minutes is valid, and
19 approximations of proportions are not far wrong. 20
20 minutes to measure the heights and ages of three trees.

21 The number of trees in the sample plots
22 on all 10 stations typically runs from 50 to 150. It
23 can range much more or much less than that, but let's
24 say it can run in that area and, particularly, in the
25 older more mature stands we want to pay more attention

1 to this, the number may well be 50. It has taken 20
2 minutes to measure three, obviously there will be an
3 impact in practicality and logistics if we have to
4 measure 50.

5 So the first impact, the first answer to
6 the question is: There is a logistical answer to the
7 question which is a little bit of a follow-up on Mr.
8 Martel's comment as to, let's spend a little more
9 money, what might we get for it.

10 The second implication is that if we have
11 the ages and the heights of all the species actually
12 tallied, we could look at each and every one of the
13 appropriate yield tables, so an example we had for the
14 jack pine table, we go on the jack pine table, we know
15 the age, the height, we know the site class, we know
16 the table. For the poplar we know the age, the height,
17 the site class the table. And for the spruce,
18 likewise.

19 So for those three species, given they
20 were the only three and they were the three predominant
21 ones, but given they were the only three, we could go
22 into the tables, we could look up the values for the
23 right ages and heights, we would still have to estimate
24 what the stocking was, but we have got the basal area
25 sweep so that also is possible.

1 So for the stand where the ground sample
2 was taken the volumetric estimate should be more
3 precise because we have estimated the volume for each
4 and every one of the components best we can with that
5 procedure of using a yield table, ages, heights, site
6 class to estimate volume. So for the stands where the
7 sample plot was placed, ground plot was placed the
8 estimate should be an improvement.

9 Again, early this morning I pointed out
10 that the estimate of the poplar and black spruce may or
11 may not compensate, one might be an underestimate and
12 one might be an overestimate.

13 The third part answer to the question is:
14 What do we do and what happens to those stands where
15 there is no ground sample? Do we get a better estimate
16 from the photointerpreter looking at - this is
17 composition - ages and heights, site class, having that
18 mental translation of knowing the ground plots in some
19 cases were mixtures, knowing that where he found a
20 45-year-old jack pine he found a 45-year-old poplar,
21 and/or a 30-year-old spruce, given that combination is
22 kept in his head, does the photointerpretation improve.

23 Now, having never been through this
24 exactly the way I described, it is hard to estimate
25 except there is every likelihood to believe that it

1 should provide a slightly improved estimate for the
2 photointerpreted areas. There is more knowledge about
3 the forest from the ground plots, there is more
4 information about: Is the jack pine and the spruce of
5 the same age on where the grounds plots were.

6 So there is a inference that there could
7 be an improvement. So three reactions to the
8 possibility of changing the methodology the way it was
9 advocated.

10 Q. Dr. Osborn, the one item I would like
11 to refer to -- the last item I would like to refer in
12 relation to what is put on the stand map at page 101 is
13 to ask you what is site class?

14 A. Okay. On that stand description,
15 that fourth item in the list of the stand description,
16 and the answer to this in essence is given on page 31,
17 paragraph 56 and, as it says in paragraph 56:

18 "The site class is a measure of the
19 relative productivity and within the
20 Forest Resources Inventory of Ontario,
21 as in most other parts of the world, site
22 is estimated by a relationship between
23 the height and the age of the trees on
24 the area."

25 With the previously referred to comment

1 that X in Ontario is better than 1, which in turn is
2 better than 2, 3, and 4.

3 Q. Which paragraph were you reading
4 from, Dr. Osborn?

5 A. Paragraph 56 on page 31.

6 Q. Could you advise how site class is
7 determined?

8 A. When the normal yield tables were
9 constructed - and these are included as Figure 31 on
10 page 187, and they run from page 187 to 227 - this is a
11 description of how the normal yield tables were
12 constructed.

13 There is a description on page 195 that
14 essentially describes how site class -- basic theory of
15 how site class and site classes in Ontario were
16 derived. In the production of these yield tables it
17 states on page 194, and on page 194, under field
18 methods -- in that left-hand paragraph under field
19 methods at the bottom of the paragraph on page 194,
20 just to the bottom of the paragraph above the map sheet
21 it describes that:

22 "In all 546 single examination sample
23 plots were tallied."

24 So in the construction of these tables
25 some 546 plots were tallied. That means the trees were

1 measured, actually the trees were cut down in this
2 sample, it was a destructive sample, it measures the
3 height, diameter and were measured and cut up and
4 measured for volume.

5 Now, we are coming to the question of
6 sight, when they looked at these particular plots how
7 did the heights range, at any particular age what was
8 the range of heights. You have got a bunch of plots
9 and this was done for a particular species for which
10 the height of the plot was known and the age of the
11 plot was known, and so you could plot what were the
12 heights of the trees versus the age of the trees.

13 And the author of the publication, Dr.
14 Warner Plonski from Poland, in essence had found from
15 studies in scotch pine in Poland that essentially got a
16 population whose height, age, development tends to be
17 like this, and this is very typical throughout
18 development in the world in terms of trees, and what
19 Dr. Plonski did again is that which is done by most
20 forest mensurationists, he found the top and the bottom
21 at a particular age - and the age would vary with the
22 species - and at a particular age what was the typical
23 range covering the data.

24 Dr. Plonski advocated that in essence
25 that we divide it into three classes. He then decided

1 for a technique, which is described in the publication,
2 called harmonized curves of defining therefore the
3 zones of 1, 2 and 3 that you have seen in the examples
4 we presented earlier this morning of height over age
5 development.

6 So the plots were measured, the plots
7 were tallied for height and age, the data was plotted
8 and at a certain age what was the range in heights,
9 let's break it into a set of classes inferring that we
10 have in the case, at that time, in the data we
11 collected, three site classes; there is 3 for jack
12 pine, there is 3 for poplar, there is 3 for white
13 birch, there was X for black spruce - we talked about
14 earlier - because after this was done some other data
15 showed we had some trees up in here.

16 Q. Which are...?

17 A. Which are called X or 1A in the yield
18 table.

19 Q. Growing higher than the site class 1?

20 A. And, therefore, at any particular age
21 they are higher. Let's hope that nobody finds any
22 better because we are going to have difficulty defining
23 what comes beyond X. But we also had plot subs that
24 are lower than this that are, of course, site class 4

25 The derivation of site class, this is

1 essentially the procedure that was followed, it is
2 described in detail -- or described in general terms,
3 not in detail, on pages 187 onwards and how those
4 tables were constructed.

5 MR. FREIDIN: What is that Document?

6 THE CHAIRMAN: Exhibit 90.

7 MR. FREIDIN: Exhibit 90. Would you just
8 write Exhibit 90 on the top left-hand corner, please.

9 ---EXHIBIT NO. 90: Hand-drawn diagram produced by Dr.
10 Osborn.

11 MR. FREIDIN: Q. Would you advise, Dr.
12 Osborn, what the significance of an area being
13 assigned -- what is the significance of an area being
14 assigned a site class?

15 DR. OSBORN: A. We go into the forest
16 and we do this with the stands, we have a height and an
17 age and on these sets of graphs that we have
18 illustrated we can go in and ascertain at that point in
19 time I am into site class 2 zone. Bang, I can use that
20 information to know which yield table to go into to
21 estimate for that stand what is the volume, what is the
22 basal area, and we went through that earlier this
23 morning. So site class is a key entry into the
24 estimate of, in this case, volume.

25 There is also another management

1 inference. If I am site class 2, so far to date I have
2 grown better than stands in site class 3, but not as
3 well as those in site class 1.

4 Let's get closer to when actually I might
5 be harvested and I get older and I am found to be site
6 class 2 as opposed to site class 1. We cut both the
7 site class 1 and site class 2 stands. Some
8 implications may be productivity on this particular
9 stand has shown in the past --

10 Q. Which stand is that?

11 A. In the one that is in site class 1,
12 the stand that was in site class 1, when harvested, has
13 shown in the past productivity, height, volume values
14 in the yield table are higher, higher than the stand
15 that is being cut in site class 2.

16 And there is a productivity inference:
17 It has grown that way in the past for a variety of
18 reasons, and we made some comments day before yesterday
19 about the class being an indicator of tomorrow. If we
20 would need to reinvest, regenerate, maybe we might be
21 wiser to think, if we have to make a choice, that one -
22 the one that is site class 1, the higher productivity,
23 may be a better investment in terms of returns than the
24 site class 2.

25 Maybe there will be later panels to

1 present evidence to give you a hint of what that might
2 be, as to whether or not that choice on productivity on
3 mensuration alone is sensible, since mensuration the
4 site class 1 may have been higher productivity;
5 because in the past it has yielded more volume; it may
6 or may not be easy to regenerate. A whole range of
7 site factors in there. It may be, may be easier to
8 consider this one.

9 So it is not just forest mensuration the
10 forest manager uses, there are other features of the
11 site, other pieces of information that need to be
12 thought about than just this alone.

13 MR. MARTEL: Is that for growing, if it's
14 in 1 which means productivity is higher, I think you
15 just said that regeneration might be difficult?

16 DR. OSBORN: Yes, sir.

17 MR. MARTEL: Why in a class 1 area, which
18 I presume is probably the best area to grow, would
19 there be difficulty in regenerating that area?

20 DR. OSBORN: Because of the words you
21 just used, a higher productivity area for the trees,
22 yes, exemplified by forest mensuration. A higher
23 productivity area for other forms of vegetation that
24 you may or may not want, weeds.

25 So in actual - and I am going to step

1 right outside my area of expertise - but from practical
2 knowledge, the difficulty in re-establishing that may
3 be because other things also on that productive site
4 grow well as well. So we take forest mensuration as a
5 piece of the story, not the entire story.

6 As I mentioned, later panels will discuss
7 this in far more pragmatic, practical detail, but in
8 answer to the question: What is the significance of
9 the site class, it is mensurational and also
10 inferential in forest management, but not the only
11 answer.

12 MR. MARTEL: If you had a choice of 1 or
13 2 that you are going to cut, and you are in business,
14 surely the logical place, I would think - I actually
15 don't know - would be that area that's going to
16 regenerate the best in terms of the investment you keep
17 talking about?

18 DR. OSBORN: The easiest answer would be
19 to back out to later panels, but it is a story of what
20 does it cost you, what it is worth today, was it worth
21 tomorrow; what do you get today, what you are going to
22 cost today to put it in the ground for the value
23 tomorrow.

24 Is the increased productivity that much
25 higher in here in dollar value, in very simple economic

1 terms than the cost of the establishment. Now, I keep
2 saying may, you have to know the site, the species, the
3 methodology, all of those are in the equation.

4 In answer to the question: What is the
5 significance of being in site class 2 versus site class
6 1, there are forest mensurational productivity
7 inferences and inferences about what that might mean in
8 terms of site and regeneratative capability.

9 Now, there are additional data that go
10 with the forest mensurational data that are needed to
11 first answer your question.

12 MR. MARTEL: Other forest uses data?

13 DR. OSBORN: That is true. That's wasn't
14 exactly what I had in mind, but yes, sir, that's true
15 as well.

16 MR. FREIDIN: Q. I am just wondering,
17 Mr. Armson, are you able to add or shed some more light
18 onto Mr. Martel's question?

19 MR. ARMSON: A. Yes, if I might now -
20 and I hope I will be shedding more in a subsequent
21 panel - but I think, Mr. Martel, in addition to what
22 Dr. Osborn has talked about, it is not uncommon; in
23 fact, it is usually the case that using mensurational
24 measures, height over age, one can achieve the same
25 heights over age, or the same level of productivity,

1 but in terms of the soil conditions, the nature of the
2 soil, they may be totally different.

3 For example - and I will use black
4 spruce - it is quite conceivable, in fact we have many
5 illustrations of black spruce in site class 1 or indeed
6 X, in one instance growing on a fine-textured soil,
7 reasonably well-drained, no stones, no boulders, no
8 impediments, relatively flat, the type of soil you
9 think of as ideal for agriculture activity, and in the
10 other instance it is growing on organic matter over
11 what we call a boulder pavement, on a gentle slope,
12 with running water.

13 Now, those two stands of black spruce may
14 well have exactly the same height or age and same
15 productivity, but in terms of treating them
16 silviculturally, they are totally different conditions
17 in terms of competing species, the nature of the
18 equipment and the ease with which you can do it.

19 So in terms of an investment come about,
20 it is quite different. Both stands, in my experience,
21 both originated after a severe natural fire, but you
22 have two totally different soil conditions. So that is
23 one of the elements.

24 The other element has been referred to
25 and, that is: One may take a lower productivity over a

1 period - and I would suggest with jack pine - which is
2 growing on a poorer soil, site class 2, but the cost of
3 investing in regeneration and general ease may in fact
4 be such that - and on wide areas - that you are far
5 better off investing more of your dollars for, in
6 certain kinds of regeneration, there than on the site
7 class 2 areas which, in themselves, are more
8 productive; but, for example they have competing
9 vegetation, usually, they also may be broken up into
10 smaller area, so that in terms of the overall, they are
11 more difficult to treat.

12 Those are the kinds of things that Dr.
13 Osborn was referring to and we will be dealing with
14 that later.

15 MR. MARTEL: If I can ask one short
16 question then. How long have we really been taking all
17 of these factors and working them to decide what we are
18 going to cut, where we are going to cut and so on and
19 where are we going to reharvest and so on; how long
20 have we really been in the game doing that?

21 MR. ARMSON: I think I mentioned in Panel
22 2, individual foresters have been doing that for a long
23 time - and I think this is your question - in a
24 co-ordinated way in terms of public land, we are just
25 coming into that period and this is what I will be

1 addressing in terms of how we come at that later on.

2 MR. MARTEL: Thank you.

3 MR. FREIDIN: Q. In the last example
4 that you gave, you had two site classes, one was better
5 than the other. Do you recall the numbers you were
6 using, site class 2 and site class 1?

7 MR. ARMSON: A. Yes.

8 Q. And so in your evidence if you were
9 referring to the poorer site, you would be referring to
10 site class 2?

11 A. That's correct. Very simply, if I
12 have 200 hectares of site class 2 and it's readily
13 reached, easily accessed, no impediments it costs me
14 some "x" dollars to regenerate and I have an equal
15 sized area, 200 hectares but it is slit up into, let's
16 say, 20 pieces averaging 10 hectares and it's scattered
17 around, then the principle is yes, invest in the most
18 productive, but its distribution and location is such
19 that I am probably going to put my money in the other
20 one rather than the one that is fragmented.

21 That isn't always the case, but that's
22 the kind of thing you have to take into account.

23 Q. Thank you. Dr. Osborn, in your
24 evidence you indicated that there was information about
25 the forest resource in the stand maps and in paragraph

1 47 of the witness statement there is reference to a
2 more detailed description of each stand that's
3 contained in a Report No. 4, which is one of four
4 reports prepared as part of the forest resources
5 inventory.

6 At page 182 of the witness statement you
7 have a document entitled: Details of Forest Stand
8 Record and can you advise the Board of the purpose for
9 preparing this document and then proceed to deal with
10 the particulars?

11 DR. OSBORN: A. The document at page 182
12 was included to have the Board aware of the details
13 that are associated, that are recorded with each and
14 every forest stand in the province. We have talked,
15 when we talked about the map, about the stand number
16 and the species, age, height, stocking, but there are
17 other pieces of information associated with those
18 stands for which there is neither room on the map or
19 necessarily an immediacy to show them, but they do
20 exist and they can be portrayed in tabular format.

21 So I wanted to go through page 182 to
22 highlight those items that we haven't touched upon at
23 the moment just to make you aware of what does exist in
24 this record.

25 In this particular document on page 182

1 there is name or the abbreviation, shorthand, that goes
2 with the attribute or the character associated with the
3 record, on the right-hand side some two-word
4 explanation in English of what does that abbreviation
5 mean.

6 I will go through the list, but I will go
7 quickly through some items that I will do collectively
8 and then dwell some time on others that I think are
9 more important that you understand.

10 MU #, management unit number. Each and
11 every stand, we know which management unit it is within
12 and we talked earlier about management units.

13 Working circle number is a possible
14 subdivision of management unit. Within the area of the
15 undertaking it is of virtually no concern.

16 Working circle status is essentially an
17 indicator of: Am I a FMA, am I company unit, am I a
18 Crown unit and we talked about that. It's a flag, an
19 indicator.

20 Map sheet number and township number, we
21 have talked earlier about an organization of the data
22 into map sheet or base maps and also an earlier comment
23 about townships and now Exhibit 85 exists, Exhibit 85
24 actually is an FRI base map, a hundred square mile base
25 map. So it gives you some idea of the size.

1 The township and map sheet in here, in
2 some cases those overlap, so the first five items are
3 really a geographic identifier: Where am I in the
4 province.

5 Then we come to stand number and we have
6 talked about that.

7 Working group we have spoken about,
8 essentially the predominant species, with one comment.
9 There was no example given when we described on the
10 map, but what do we do when we have jack pine 50/poplar
11 50, black spruce 3/poplar 3/white birch 3, when we have
12 equality, then what do we do?

13 Within the FRI, after discussion with the
14 users, there are some rules, particularly in the
15 computer software, that for this unit, if I have got a
16 50/50 split of poplar and spruce and if spruce is more
17 important to me managerially at this time, a 50/50
18 split is called spruce in that particular unit and the
19 rules are set up in the computer that way.

20 Now, the rules can be changed if the unit
21 forester or the forest manager finds there is cause to
22 change that. The people in the district have the
23 ability to switch that, but typically there are rules
24 dealing with splits.

25 The stand type: Stand type really is a

1 coding of: Do I have an even aged stand, trees more or
2 less all the same age, same height as shown by the
3 photointerpreter; do I have a stand where I can see it
4 is multi-layered, multi-canopied and possibly
5 multi-aged; do I have a stand with a possible
6 difficulty in estimation.

7 So understand type: We have some flags
8 up to help forest managers have them identified, what
9 might be a problem in terms of identification, check on
10 this one. There is also a flag that says: am I a
11 plantation now.

12 Area we have spoken about, it is recorded
13 on the map sheet and ownership we will speak to in just
14 a moment. Essentially there are nine ownerships codes
15 in the FRI and the details of those will be provided a
16 little later.

17 The region district: Where am I at
18 geographically, administratively.

19 The year of origin. Some of the FRI that
20 you may see, some of the forest stand maps that you see
21 in fact, the example that you have seen has age on it,
22 age of the stand. Within the record, what's stored now
23 is the year of origin and if you know the date the
24 inventory was done and you know the year of origin of
25 the stand, the difference between those two is the age.

1 Now, the year of origin was a suggestion
2 that came really out of forestry industry. Every time
3 you change the map sheet, because the stand gets older
4 and older and older, you have got to keep changing the
5 age. If you have got the year of origin on the map
6 sheet you don't have to keep changing the year of
7 origin until you finally cut it. One less piece of
8 work to do on the map sheet, minor. It confuses
9 people, why I don't have age in the record though.

10 Height, we have talked about.

11 The year of update, this is really tied
12 in with year of origin. Yesterday Mr. Martel asked me
13 a question: What did we do in bringing data up to date
14 in the case of the FMAs, what techniques did we do.

15 The data may have been 1975, we wanted to
16 bring the data up to 1980. The record showed what the
17 stands looked like in 1975 and the age was the year of
18 origin minus 1975. Then we took that record in 1975
19 and we grew it up to 1980, so the values in the stand
20 record changed to reflect those of 1980 to reflect
21 trees that were now five years older. The year of
22 update was 1980. The difference between the year of
23 origin and the year of update will provide you with
24 that age now in the stand.

25 Q. The map doesn't change in terms of --

1 A. The map still has got year of origin
2 on it. You need to know the data on the map now,
3 whether you have changed the data on the map to work
4 out the age of the stand.

5 Site class, we have spoken about just a
6 moment ago.

7 Stocking, we have spent some time on, the
8 comparison of what do I have versus what the norm is.

9 The species per cent we have described,
10 it's in tenths. Actually as an aside, the fact that
11 it's in tenths in Ontario is relatively rare, many
12 other provinces don't have it that detailed, they will
13 typically tell you the predominant species and that's
14 all.

15 There are two values for activity --
16 there is two values: activity code, activity date.
17 The record let's you indicate: Why did you change the
18 record and we just made an example a moment ago of: we
19 took the data of 1975 and we updated it to 1980.
20 There's a code that indicates I have updated this
21 record.

22 We may have gone out and done a
23 supplementary piece of information, we may have for
24 that stand gone and looked for some other way. We
25 changed the record because of the look, we caused the

1 activity code to reflect somebody has changed it for a
2 purpose - if they do a certain kind of cruise - and the
3 date when that act took place.

4 The last two values are gross total volume
5 which, again, we spent some time going through the
6 yield table to derive and look up, and the CAI, the
7 current annual increment which we have spent some time
8 describing in terms of growth rate and that value is
9 also in the yield table.

10 And the list on page 182, as indicated,
11 the asterisked items, asterisked on the left-hand side
12 indicate they are on the forest stand map. There is an
13 asterisk by GTV and CAI. There has always been the
14 thought and suggestion from some users: I would like a
15 map with volumes on it. This hasn't happened yet, but
16 that's why the GTV has got asterisks on it.

17 Q. This particular list, these details
18 of forest stand record, how long has this list been the
19 information which has been collected?

20 A. This particular format on page 182
21 has been operationally in existence since I suppose
22 1984. It was part of a redesign of a piece of software
23 of how the compilation was done that took place
24 essentially in '81, '82, '83, it really came into
25 operation by 1984.

1 Q. Can you turn to page 183 of the
2 witness statement, please. And I understand that we
3 have the metric equivalent of this particular document,
4 Document No. 28, in the witness statement for Panel No.
5 3; is that correct?

6 A. Yes.

7 MR. FREIDIN: Could we make the metric
8 table the next exhibit?

9 THE CHAIRMAN: Exhibit 91.

10 ---EXHIBIT NO. 91: Metric table found at page 183 of
11 Exhibit 78.

12 MR. FREIDIN: Q. Do you have yours
13 there, Dr. Osborn?

14 DR. OSBORN: A. Yes.

15 Q. My question is: Does that document
16 contain any information regarding the stand's
17 characteristics that is not contained in either the
18 stand map or the description on page 182 that you have
19 just gone through?

20 A. Yes.

21 Q. Could you advise what those
22 differences are? Describe for us generally just what
23 the document is and then tell me what the differences
24 are?

25 A. Yes. This is one sheet of about 350

1 in the Red Lake management unit and it will tell me,
2 and it is very, very hard I realize to see because of
3 the volume of data on this particular page, but we have
4 got a Report 4 for a certain management unit which
5 happens to be Red Lake. This is produced on a map
6 sheet basis, so this is some of the data that are
7 described on the map in Exhibit 85 - it is the same map
8 sheet - this happens to be for the working group that
9 is called spruce all. So we looked at a spruce stand
10 earlier on, stand 102, and we would expect to find
11 stand 102 on here. So this is for the working group
12 spruce all, we have talked of working group. The data
13 also segregated by ownership - which we haven't talked
14 about yet - but this is for Crown land.

15 And then on this particular sheet, if we
16 go across the column headings, we have the stand, which
17 is the stand number, which we talked about; we have the
18 species composition, which we have described. The
19 third main column is the age in years.

20 We then have the height; the SC, the site
21 class; we have the stocking which we talked about; we
22 have a column of basal area in square metres per
23 hectare which is used, particularly in the hardwoods
24 the basal area is a more key management factor.

25 We have the volume GTV, cubic metres per

1 hectare. We've covered all that material to date as we
2 have covered the CAI per hectare, all the table
3 look-ups. So up until CAI column, the material has
4 been covered.

5 We then have a couple of different
6 columns labeled MAI per hectare and MAI maps. There was
7 a brief reference two days ago to increment, that mean
8 annual increment MAI, was an overall average growth as
9 opposed to CAI: How well am I doing this year as
10 opposed to over the whole of my years.

11 Now we come to a couple of new columns.
12 We have a new column labeled total GTV, which is the
13 volume per hectare times the area, but from a
14 practising forester's point of view if he cuts the
15 whole stand it is that value that is of concern.

16 We have a total NMV, net merchantable
17 volume. And I made reference some time ago that within
18 the FRI recently we have provided estimates of net
19 merchantable volume with strong, strong warnings.

20 We then have a column labeled age-class
21 and in the histograms presented on Monday we had
22 20-year age-classes commonly used in those histograms.
23 We take the age and we put it into age-classes and
24 typically we will talk about those 20-year age-classes,
25 being as we have talked about 41 to 60, 61 to 80.

1 We then have the area we described. And
2 the last column is the ST type, stand type. We talked
3 about: Am I a plantation, am I a single age, am I
4 multi-aged, and the numbers in that column stand type
5 are code numbers for: Am I multi-age, am I
6 single-aged, am I plantation without worrying about
7 what the coding is.

8 So we have got a couple of new columns;
9 total volume in gross total, net merchantable and
10 age-class partitioning, aggregation.

11 Q. I note that the age-class -- or, you
12 indicated that the age-class is in 20-year periods.
13 Can you advise: Is there any significance to the fact
14 that it is in 20-year periods as opposed to something
15 else?

16 A. As explained on Monday, 20-year
17 age-classes, the FRI that was running with a 20-year
18 management plan, the cycle of 20 years has been
19 inherent since the 40s. Again, the cycle or the time
20 horizon that is common throughout both this country and
21 much of the rest of the world. In typically temperate
22 climates 20-year age-classes are typically the
23 aggregates used.

24 Now, on the particular slide we have
25 highlighted the particular stand that in fact we were

1 looking at when we looked at the forest stand map and
2 we were looking at a spruce stand that was labeled 102.
3 So the record for that stand is given in fact in this
4 report along with the record of all the other spruce
5 stands on this map sheet that are in Crown ownership.

6 The stand 102 and values for that stand,
7 if you track across it, will be those that are actually
8 given on the map sheet. So we have the stand
9 description which is black spruce 8, jack pine 1 and
10 poplar 1, the same stand description. So this
11 particular record is given on the map, will describe
12 the format of that record, we have got a report that
13 includes that record.

14 THE CHAIRMAN: Mr. Freidin, you are
15 looking at the second page, are you not, of this
16 Exhibit 91?

17 MR. FREIDIN: That's correct.

18 DR. OSBORN: Mr. Martel?

19 MR. MARTEL: When you compile it at the
20 district level, are all -- the Pjs are put together, is
21 that it in one --

22 DR. OSBORN: Yes. The way the data are
23 organized is the jack pine stands in the jack pine
24 working group are reported in Report 4 which is what
25 this report is. All the jack pine stands are in this

1 particular map sheet are presented together, and then
2 you have the jack pine stands in its -- so we have got
3 the jack pine stands in this particular map sheet, in
4 that record and a bit more, there is two or three pages
5 of this particular jack pine record.

6 And it happens to be spruce, it so
7 happens, but the spruce trees...

8 MR. FREIDIN: Q. Let me just slow you
9 down for a second. The area you are referring to is
10 the area in Exhibit 86 that you have marked off with
11 the square at the bottom left-hand side?

12 DR. OSBORN: A. Yes.

13 Q. Thank you.

14 A. So that particular record on the
15 screen illustrates some of the spruce stands in the
16 spruce working group on that particular map sheet.

17 The next paragraph of that report would be
18 the spruce stands on one of the adjacent map sheets,
19 the spruce stands, spruce working group on one of the
20 adjacent map sheets that are under Crown ownership.

21 So the report tends to - which is the
22 Report 4 in the FRI set of reports - the report will
23 tend to aggregate or keep the data close together that
24 seems to be managed together, and is the working group
25 that is typically managed.

1 Crown land working group that's managed.
2 We don't aggregate all the spruce stands that are in
3 the park and the spruce stands that are on the rest of
4 the Crown land all in one big bundle. We don't manage
5 it that way.

6 We don't aggregate the spruce stands and
7 the jack pine stands all in the same map sheet
8 together, because we don't manage it that way, and you
9 will hear a little bit more about that when we speak
10 about yield regulation.

11 So the organization of the data are that
12 which appeared to be convenient to the user.

13 Just to give you some numbers. A unit may
14 contain 20, 30, 40,000 stands; 20, 30, 40,000 lines,
15 records to be organized in a way that is most
16 convenient for the user.

17 Q. Dr. Osborn, could you tell me: Does
18 the forest resources inventory just describe the
19 forest?

20 A. No.

21 Q. And does the witness statement
22 describe what in fact is included in the forest
23 resources inventory or what it does cover in addition
24 to the forest?

25 A. Yes. On paragraph 49 on page 30.

1 Q. Does 48 deal with the same matter?

2 A. Oh, yes, sorry. Paragraph 48, and
3 paragraph 48 speaks some words to the document that is
4 given on page 185.

5 Q. Can you describe those various
6 components then, please?

7 A. The document on page 185 which covers
8 two pieces of information: One coverage, one
9 components. The question of coverage has been spoken
10 to before in the evidence in terms of the geographical
11 coverage of the forest resources inventory. However,
12 within that geographical area from approximately 52nd
13 south to the rest of Ontario going south, the entire
14 province is covered by the forest resources inventory
15 in Ontario with the exceptions of some federal land
16 that I will speak to in a moment.

17 And as an aside, this is rather unusual
18 and is not necessarily the same in other provinces
19 where typically the ownerships that are covered are
20 perhaps just the Crown land and not necessarily many of
21 the other parts of the land base.

22 Now, Ontario has a coverage and each of
23 those pieces of the province is identified as to its
24 ownership - and exact ownership breakdown we will soak
25 to in a moment - but within that coverage, the total

1 area is described in the forest resources inventory by
2 the following components, and the first of that is
3 water. It might seem an anomaly, but within the forest
4 resources inventory data set there is an approximation
5 of water in the management unit.

6 The next major component is that which is
7 labeled non-forested and Mrs. Koven had a question two
8 days ago that sort of spoke to part of this and within
9 the forest resources inventory the non-forested portion
10 is sub-divided as is shown into developed agriculture
11 land, grass and meadows, and areas called unclassified.

12 Now, within the forest resources
13 inventory unclassified is perhaps one of three major
14 types: Built-up areas, roads and transmission lines,
15 pipelines, and areas like gravel pits, this sort of
16 thing, relatively small -- and gravel pits. They are
17 the three main components of non-forest.

18 Now, we move into the part of the forest
19 resource inventory that perhaps is closer to the title,
20 and it is the forested part of those management units.
21 And the forested part is broken into two main
22 sub-divisions.

23 There is the forested part that is deemed
24 non-productive, it is primarily areas where at this
25 point in time when the inventory is done it is

1 estimated that the areas cannot grow trees, in a
2 commercial sense, and the other major break of forested
3 is productive.

4 Just to take non-productive for a moment.
5 Within the non-productive we have four major
6 sub-divisions. these are muskeg, treed muskeg, brush
7 and older, and rock. Now, each and every one of these
8 components is identified in the photointerpretation
9 process, compiled and transferred to the map, estimates
10 of area are made for all of these pieces, not just the
11 forest.

12 The last major component is the forested
13 productive and is that part of the management unit that
14 is or was forested and is deemed to be productive,
15 productive in a timber management commercial tree
16 growing sense. So the forest resource inventory is
17 dealing with the management unit but from a forest or
18 timber management type of component.

19 And just as an aside, forested
20 non-productive includes brush and older which, from a
21 timber management point of view, is appropriate but
22 from other parts of the resource management point of
23 view may or may not be non-productive. So it is a
24 recognition of where this is coming from.

25 The forested productive is further

1 sub-divided into two managerial components. The first
2 is protection forest, protection forested productive,
3 and within the FRI there are two main sub-divisions.
4 The first of those is those stands that have been
5 classified as site class 4 from the height and age
6 relationship at the time the inventory was done.

7 The photointerpreter looks at the
8 photograph, looks at the working group species, looks
9 at the height, the age, looks at the table, evaluates
10 that I am poorer than the lower limit of site class 3,
11 I am site class 4. It is labeled as protection forest.

12 So the height and the age indicates that
13 either the trees there have grown poorly because of the
14 nature of the site and/or the trees have grown poorly
15 because they were not, through some circumstances, the
16 right species on that site. You get what are called
17 off-species. It doesn't necessarily mean the site is
18 poor, it merely means the tree growing on it is poor.
19 It is a caution.

20 Q. In that particular case, what might
21 have caused -- when you say that it had the wrong type
22 of species on it, what might happen if you harvested
23 that area and put a different species back by planting
24 or seeding in terms of the site class?

25 A. This comes back to the question about

1 the mensurational use when we are talking of height and
2 age which is done by a working group. So the height
3 and age showing site class 4 for the tree on the site
4 is an indication of how well that tree has done on that
5 site, not necessarily a very good indicator, it is a
6 forest mensurational indicator of how productive that
7 site might be for other species.

8 Now, unfortunately the height/age
9 relationship cannot be converted to what site class 4
10 for poplar is site class 3 for spruce, site class 2 for
11 jack pine. Therefore the question of: If you put
12 another species back on that site it may grow from the
13 height/age mensurational relationship in an unknown
14 fashion. It may grow poorly, it may grow well. You
15 need other factors about the site from other sources
16 than height and age to have a feeling for what may
17 happen.

18 MR. MARTEL: But you are doing that in
19 parts of the province now; aren't you?

20 DR. OSBORN: In the area...

21 MR. MARTEL: Yes, getting rid of a
22 certain species to grow yet a different type of
23 species. I mean you use, I think, chemicals to get rid
24 of a certain type of vegetation to get the one you
25 want.

1 DR. OSBORN: Such a question, Mr. Martel,
2 I will back out of completely if you don't mind. My
3 expertise goes to mensuration and what it means in
4 management. In terms of operations you have just
5 alluded to, with all due respect, I do not know. So
6 with respect --

7 MR. FREIDIN: Q. Perhaps, I don't know,
8 Mr. Armson may be able to answer that question.

9 MR. ARMSON: A. Well, Mr. Martel, in
10 terms of the site class 4, that would refer to
11 commercial tree species which would be different -- and
12 we might well be getting rid of, let's say, poplar
13 growing on a poor site for poplar and introducing jack
14 pine which might be, in our opinion, professional
15 opinion, site class 2 for jack pine.

16 I take it that is the kind of thing you
17 are referring to.

18 MR. MARTEL: Mm-hmm.

19 MR. ARMSON: Yes, we do that

20 DR. OSBORN: So within the protection
21 forest, we have the site class 4 classification and we
22 also have islands of a certain area that are called
23 protection forest.

24 The last of the major categories is the
25 production forest under forested productive, and as the

1 title would infer and the production forest from a
2 timber management point of view, are the areas of the
3 greatest interest and where the greatest action may
4 take place.

5 So the production forest, in turn, has a
6 sub-division. There are areas classified as production
7 forest reserve, and to distinguish those, we have
8 production forest regular.

9 As the diagram on page 185 shows, all of
10 the productive forest, all of the forested productive
11 forest, protection and production, all of that is
12 classified into working group and site class and,
13 similarly, age-class and all the other parameters that
14 go with stand descriptions that we have spoken to
15 before.

16 Production forest reserve and regular.
17 Production forest reserve is a category that has been
18 photointerpreted and in the demarcation of the stand
19 boundary, the photointerpreter has looked at the stand
20 and the photointerpreter has observed that the stand
21 has a topography of steep slopes, it may or may not
22 appear that there are considerable rock outcroppings
23 and/or shallow soils, so we have got exposed bedrock.

24 The photointerpreter looks at that with
25 some knowledge as a forestry technician, as they all

1 are, and says: That may be an area that will give rise
2 to some possible difficulties in harvesting operations
3 and/or regeneration operations.

4 So the photointerpreter says: I will try
5 and help the forest manager by flagging those stands to
6 bring them to the forest manager's attention, that when
7 I looked at the photograph I could foresee steep
8 slopes, rock outcrops. In your area, for how you do
9 business, in your management unit, you translate that
10 into whether that is important or not important, I will
11 flag it for you.

12 As opposed to production forest regular
13 which is stands of site X, 1, 2 and 3, much as the way
14 we described when we went through the stand examples in
15 the Red Lake Crown management unit.

16 MR. FREIDIN: Q. Okay. Can I just go
17 back to your comment on production forest reserve which
18 is a flag to the forest manager that there may be a
19 problem, and you said whether it is of interest to him
20 or not -- or important to him or not, him or her. Do
21 you know what happens, or what would cause such a
22 designation to be thought of as important?

23 DR. OSBORN: A. In the eyes of the
24 photointerpreter - and this is where this flag is
25 coming from - the photointerpreter is looking and

1 saying: I see on this particular stand I have got a
2 terrain that is steeper than normally expected in
3 Ontario, a terrain that I think may give rise to some
4 access difficulties, operational difficulties. And
5 that is essentially what is coming out of the
6 photointerpreter in putting up that label to say: Be
7 aware of what I have seen.

8 Q. And that is information given to the
9 management unit forester?

10 A. It is given on the photograph,
11 because it is labeled on photograph, it is translated
12 in the compilation onto the map sheet - we didn't have
13 an example - but the map will show this flag, this
14 ability that it is production forest reserve. The
15 report will also have that label on it for that
16 particular stand.

17 So, yes, that information gets passed all
18 the way through to the forest manager.

19 Q. I understand that the description of
20 protection forest in particular -- pardon me, to be
21 more correct, the description in the Environmental
22 Assessment Document of June, 1987, which is Exhibit No.
23 4, regarding the FRI, including the description of
24 these various components of the FRI, were changed as
25 outlined in Exhibit No. 79; is that correct?

1 A. Yes.

2 Q. Could you describe the changes which
3 were made related to the description of the components
4 of the FRI? Perhaps indicate the reason for -- the
5 major reason for the change.

6 A. Exhibit 4, which is the Class
7 Environmental Assessment Document. Exhibit 4 has,
8 starting on page 110, halfway down page 110, line 16, a
9 heading: The Forest Resources Inventory, and that
10 description of the forest resources inventory continues
11 through page 111 to approximately halfway down page
12 112--

13 Q. Would you mind --

14 A. --to line 15.

15 MR. FREIDIN: And you will note that that
16 particular change, Mr. Chairman, is indicated on the
17 first page of Exhibit 79 under Item 1. That is just
18 the covering letter under which this particular change
19 to the Environmental Assessment Document was sent to
20 the various people identified, to the parties.

21 There are a couple of other minor changes
22 that I don't think I will have the witness deal with.

23 Q. Could you identify, or are you aware
24 of the major reason that the section was changed?

25 A. Yes. On page 111, the top of page

1 111, of Exhibit 4, there are a set of words which read:

2 "The protection forest can be described
3 as productive forest lands on which
4 timber management activities cannot
5 normally be practised without incurring
6 deleterious environmental effects because
7 of obvious physical limitations such as
8 steep slopes, shallow soils or bedrock."

9 As has just been described in going
10 through the list of components on page 185, protection
11 forest in the resources inventory is made up of two
12 sub-components: Those labeled site class 4 and islands
13 of 40 hectares and less.

14 And so the words that I just read
15 describing protection forest on page 111 of Exhibit 4
16 did not, in fact, describe what is labeled and what is
17 classified as protection forest within the forest
18 resources inventory.

19 And so the description that was given on
20 the beginning of page 111 on Exhibit 4 was changed to
21 the words that I have given in Exhibit 79.

22 Q. And the words in Exhibit No. 79, am I
23 correct, begin:

24 "In relation to protection forest..."
25 begin at the bottom of page 2 of the attachment and run

1 over to approximately the middle of page No. 3 of the
2 attachment?

3 A. Yes. Right at the bottom of page 2
4 in the last line:

5 "Productive forest lands of site class 4
6 are categorized as protection forest, the
7 islands piece as well...", yes.

8 Q. When you were referring to production
9 forest reserve, you mentioned that a matter which may
10 cause the photointerpreter to flag the area might be
11 steep slopes. Can you advise whether the degree of a
12 slope can be determined by using aerial photographs?

13 A. Yes, it could be. And the
14 justification for my comment is a recent experiment
15 using actually one of the photointerpreters in my
16 section who was asked to do this sort of work in
17 conjunction with fisheries habitat guidelines.

18 And the request was to see whether in
19 fact the fishery habitat guidelines regarding slopes,
20 which at that time were being estimated from ground
21 measurements, whether in fact that practice could be
22 done from aerial photographs, photogrammetrically - you
23 can actually look at the photographs stereoscopically,
24 with different devices, estimate the slope. And this
25 was an experiment to see whether in fact that practice

1 could be done, at that time in conjunction with fishery
2 habitat guidelines.

3 The fact that it could be done under
4 those circumstances is sort of an indication that, yes,
5 that measure of slope could be made with aerial
6 photography.

7 Q. And to make that observation through
8 the use of aerial photography, do you have to be or
9 have the expertise of the photointerpreters who
10 interpret the aerial photograph for the purposes of
11 providing the information regarding stand composition
12 that we reviewed at some length?

13 A. No, that is not necessary. You do
14 need to be able to see stereoscopically, but the
15 ability to interpret a tree species is not required to
16 measure slopes.

17 Q. Could you turn to page 13 -- pardon
18 me, 186 of the witnesses statement, and on that
19 particular page is a document entitled: Forest
20 Resources Inventory Ownerships. And are these the
21 ownerships of -- perhaps you could just describe what
22 that is?

23 A. The forest resources inventory, as
24 described when we talked about the components on page
25 185, I made mention of the fact that we will describe

1 the land within the management unit, with the exception
2 of some federal land, in totality and we will classify
3 the land in the water, in the non-forested, each of
4 those categories as we find them by ownership.

5 The word ownership is in inverted commas
6 on the document on page 186 because it is not strictly
7 ownership, it is ownership and land use as you will see
8 in a moment.

9 The first of the categories is Crown
10 Lands Unencumbered, and this is a value or a class
11 within the forest resources inventory for a timber
12 management type of activity, unencumbered in the sense
13 that nobody has a particular right or particular
14 constraint at the time the inventory is done in a
15 timber management sense. This might be a little bit
16 easier to explain when I come to Ownership 5, and I
17 will talk about that when I come back again.

18 Ownerships 2, 3 and 4 are variations on
19 Patent Land, and Patent Land class 2, the land is owned
20 by the owner and the trees, some or all, are in rights
21 to the Crown.

22 In Ownership class 3, the land is owned
23 outright in a fee simple context.

24 In Ownership 4, similar to 3 but
25 important from a forest management point of view, is

1 the land that is owned by forest industry, large
2 licencees.

3 Ownership 5 is provincial parks. So the
4 ownership is obviously the same as 1, it is still Crown
5 land in a provincial sense, but the provincial park is
6 a different connotation of land use than Ownership 1.
7 So this unencumbered in 1 refers to things that are not
8 like the constraints or the classification of having
9 something in a provincial park from a timber management
10 viewpoint.

11 THE CHAIRMAN: Mr. Freidin, is the
12 reference to licencee used in the legal context there
13 in terms of ownership?

14 MR. FREIDIN: In the patent land?

15 THE CHAIRMAN: Yes. In other words, if
16 the companies are licencees they have a right, I take
17 it, under the licence to harvest trees, et cetera, but
18 they do not own them.

19 MR. FREIDIN: That's right. I think this
20 particular matter - and Dr. Osborn can obviously speak
21 better, confirm whether I am correct - but that
22 particular item is where land is owned by a person or a
23 company in fee simple, but that person or company
24 actually has a timber licence of one sort or of another
25 on Crown land, somewhere else, not on the land they

1 own.

2 So if Abitibi-Price --

3 THE CHAIRMAN: Is it not either Crown
4 land being land owned by the Crown where the Crown may
5 license the harvesting to somebody else, or land owned
6 by companies or individuals in fee simple?

7 MR. FREIDIN: Well, I think there is a
8 third category from what I described and I think
9 perhaps Dr. Osborn will have to try to explain to you
10 why there is that third category, there is not just the
11 two that you have indicated.

12 DR. OSBORN: Ownership 4, in fact quite
13 locally here, Abitibi-Price have a licence on Crown
14 land in this immediate area. Abitibi-Price own
15 outright what was CPR Railway line holdings outright,
16 land and timber, on a circle of I think eight or nine
17 blocks off the CPR railway line. They own fee simple
18 rights to the land and the trees. They are "the trees
19 are Abitibi-Price", they are not Crown land, it is not
20 Crown trees.

21 So Ownership 4 is where a private owner -
22 in Ontario this is not as common as in other
23 jurisdictions - but in Ontario it still is important to
24 know what resources the large licensee has as the
25 source of supply to their mill or what have you.

1 Spruce Falls own three and a half
2 townships in Kapuskasing. So Ownership 4 are those
3 pieces of fee simple Ownership 3-type land where we
4 have especially said: We will try and pay attention to
5 those somewhat different to Ownership 3 because the
6 owner of those lands is somebody with whom we deal with
7 licences on Crown land.

8 MR. MARTEL: Algoma Central?

9 DR. OSBORN: Yes, sir, Algoma Central
10 would be a good example of Ownership 4. It is not
11 Crown land Algoma Central had, it is their own land and
12 the trees on those lands are "are those of Algoma
13 Central".

14 So when we deal with Algoma Central in
15 any sort of rights and Algoma Central trying to move
16 wood around, we have an interest in what land have they
17 got, what trees have they got, they the company. It
18 has an impact upon supply discussions.

19 So Ownership 4 is a special example in a
20 timber management sense, a special example of Ownership
21 3 fee simple land.

22 THE CHAIRMAN: So the reference to
23 licencee means that you have dealings with them on
24 Crown lands under licence in some other context?

25 DR. OSBORN: Yes, sir.

1 THE CHAIRMAN: Okay.

2 MR. MARTEL: What do you do with Algoma?
3 Is that a third party contract in there or a third
4 party agreement? The cutting that goes on on Algoma
5 land is not done by Algoma itself; is it?

6 DR. OSBORN: I am not familiar with the
7 operational details, sir, to know exactly the answer to
8 your question. But if the land is Algoma's and the
9 trees are Algoma's, Algoma has the right to do those
10 operation themselves and/or through contract because it
11 is not Crown land.

12 So it's the exact operational details of
13 what takes place on ACR land that I do not know.

14 MR. ARMSON: If I might. I believe, Mr.
15 Martel, Algoma is a little different in that they are
16 not licencees on Crown land, I believe. They do not
17 have their own -- and I think that is where -- the word
18 licencee is not really applicable to the ACR lands or
19 Algoma Central, but it is used, I take it, as a generic
20 here and for the reasons that Dr. Osborn has explained.

21 Does that clarify it?

22 MR. MARTEL: Yes, it is just another
23 category it looks like.

24 MR. ARMSON: That's right.

25 MR. MARTEL: It is not quite there.

1 Because if the licensee, as explained to the Chairman,
2 was with a company that had holdings in another area
3 other than their own, then in fact Algoma doesn't fall
4 into that category.

5 MR. FREIDIN: Q. But - either of the
6 panel members - if Algoma Central happened to apply for
7 and enter into a forest management agreement on crown
8 land somewhere other than their land that they owned,
9 then am I correct, Mr. Armson or Dr. Osborn, that when
10 the FRI came along and showed fee simple land that was
11 owned by Algoma Central it wouldn't get stuck into the
12 third category, fee simple, it would get stuck into the
13 fourth category Patent Land Licensee meaning that is
14 land owned by a private person, so it is still fee
15 simple, but that person has a timber licence with the
16 Crown obviously on Crown land. So...

17 MR. MARTEL: They don't, Algoma doesn't.

18 MR. FREIDIN: Well, I said
19 hypothetically.

20 MR. MARTEL: Hypothetically. But if you
21 were to put them into a category right now, Mr.
22 Freidin, where would we put them?

23 MR. FREIDIN: Ask John.

24 DR. OSBORN: Ownership 3, they are a
25 private owner, fee simple, Ownership 3.

1 MR. MARTEL: 3.

2 MR. FREIDIN: 1, 2, 3.

3 DR. OSBORN: Ownership 3. The same
4 series if you owned some forested land, that which you
5 owned would be Ownership 3.

6 MR. MARTEL: Didn't Mr. Freidin just say
7 they would go into 4. I mean, if I'm confused --

8 DR. OSBORN: Mr. Freidin made the comment
9 that if - I am not sure what the transcript will say -
10 but if Algoma Central were to have a licence on Crown
11 land.

12 MR. MARTEL: He said if.

13 DR. OSBORN: Then the land that Algoma
14 Central owned of their own, the FRI would change the
15 Ownership 3 category of the ACR lands to the Ownership
16 4 category.

17 Okay, sir.

18 THE CHAIRMAN: Just one last thing. What
19 if you had a licensee on Crown land and they did not
20 own anything else on their own in fee simple, it would
21 be described as just Crown?

22 DR. OSBORN: Ownership 1.

23 THE CHAIRMAN: Ownership 1, even though
24 the Crown did not manage that particular Crown land?

25 DR. OSBORN: Yes.

1 THE CHAIRMAN: It was under licence to
2 somebody else.

3 DR. OSBORN: All of the forest management
4 agreements, all of the areas coloured yellow on this
5 particular map - you've got to be careful - yes, all of
6 them.

7 Because we will take the Gordon Cosens
8 forest at Spruce Falls. This block and this block is
9 the FMA in Spruce Falls. Crown land, FMA agreement
10 with Spruce Falls, Ownership 1.

11 There is three and a half townships of
12 private land owned by Spruce Falls.

13 MR. FREIDIN: Which are indicated in --

14 DR. OSBORN: Which are the white block on
15 this particular Exhibit 82, are in fact Ownership 4.
16 Ownership 4, why Ownership 4? They are owned by --
17 they are fee simple land so it could be 3 or 4, they
18 happen to be owned by somebody who has a licence on
19 Crown land. Ownership 4 for this particular white
20 block, the three and a half townships in Spruce Falls.

21 MR. FREIDIN: Q. Perhaps you could
22 just...

23 THE CHAIRMAN: I think -- I do not know
24 about you, but I think you are probably better off
25 stopping there, at least for me. I think I have got

1 it. I think if you go on, I will probably get confused
2 again.

3 MR. FREIDIN: Especially if I try to
4 answer the question.

5 DR. OSBORN: Can I progress to Ownership
6 5 which is somewhat more simple.

7 THE CHAIRMAN: Yes.

8 DR. OSBORN: Provincial parks.

9 Ownership 6, is Federal Indian Reserves.
10 Ownership 7 which is labeled reserves is a category of
11 ownership land use, it is owned by the Crown - this is
12 Crown land. This would, if done today, would be
13 Ownership 1. If I went into areas today which had in
14 the past been Ownership 7 I would label them No. 1. So
15 they are Crown land.

16 In the early 1970s an effort was made
17 between field foresters in the forest resource
18 inventory to try and approximate areas along the sides
19 of rivers predominantly or the sides of lakes, a strip
20 along the sides of rivers and the sides of lakes and to
21 some extent the sides of roads on maybe three or four
22 management units in the province back in the early 70s.

23 And the idea was, as the title would
24 infer, these were areas that may or may not end up
25 being cut because of some concern for other land uses,

1 particularly some protection of habitat around a water
2 body.

3 It was found by the FRI in the early 70s
4 that this became somewhat of a nightmare in trying to,
5 first of all, determine which rivers, which lakes.

6 The second was: If you start putting all
7 those lines on the map - and you have to number the
8 stands now that are split by these zones because the
9 number on one side and the number on the other side had
10 to be separated to help the compilation - you ended up
11 with what is called a noisy map; a lot of data, a lot
12 of descriptions and you would find very -- and you
13 would find that when the data went back to the field -
14 don't forget this is a three-year compilation process -
15 and when it went back to the field they had changed
16 their mind, fair enough, on exactly where they wanted
17 the reserve and what the width of the reserve might be.

18 So the time and effort spent in the FRI
19 of trying to place these on and do the extra
20 compilation and add those descriptions, sometimes was
21 fraught with some difficulty because somebody
22 appropriately managerially changed their mind.

23 So to make a long story short, in the 70s
24 we found that the workload was just going to kill us,
25 so we stopped doing it.

1 In the late 70s nobody howled, so we
2 continued to stop doing it.

3 Right now the only area classified as
4 Ownership 7 in the FRI are the four or five units done
5 some time in the early 70s where Crown land around some
6 lakes, some rivers, some roads was classified in this
7 way.

8 MR. FREIDIN: Perhaps I should just add,
9 Mr. Chairman, Panel No. 15 will be describing maps
10 which were prepared during timber management planning
11 which, in fact, do show the location of the type of
12 reserves referred to by Dr. Osborn when they are deemed
13 appropriate through that planning process.

14 MR. MARTEL: Could I ask a small question
15 then. What about the reserves that were at one time
16 designated around all lakes and there was, what was it,
17 a 66-foot designation, where does that fit into the
18 picture now?

19 DR. OSBORN: In the FRI sense, in the FRI
20 ownership classification sense, nowhere at all.

21 With the comment that was just made by
22 counsel as to, in the timber management planning
23 process, something along the lines of that which you
24 are describing is picked up in the timber management
25 process, but in the forest resource inventory, at this

1 point in time - unless that information is presented in
2 advance of the compilation - the FRI cannot
3 second-guess and to stop second-guessing where those
4 reserves - whatever title is appropriate - may be.

5 MR. FREIDIN: I am just wondering if I
6 might ask Mr. Martel a question?

7 MR. MARTEL: Thanks.

8 THE CHAIRMAN: We ask you questions, I do
9 not know --

10 MR. FREIDIN: The reserves that you are
11 referring to, Mr. Martel, in your mind, what was the
12 cause of the type of reserves that you are talking
13 about?

14 MR. MARTEL: Well, at one time there was
15 a 66-foot right-of-way in the front of most cottage
16 property and so on.

17 MR. FREIDIN: All right.

18 MR. MARTEL: And ultimately the province
19 kept that for the longest time, then at a more recent
20 date have been selling it off. I don't know how it
21 fits into this equation that we are dealing with.

22 MR. FREIDIN: Q. Dr. Osborn, was that
23 the kind of reserve that you thought Mr. Martel was
24 asking you about?

25 DR. OSBORN: A. No, it wasn't, sir.

1 Q. Can you answer the question now
2 realizing what Mr. Martel meant by reserve?

3 A. No, I can't. I am not familiar
4 enough in the Lands and Survey Act, which is what we
5 are alluding to, in regards to that right-of-way or
6 that road allowance on lakeshore edges.

7 So not knowing the legal and operational
8 details, I can't comment upon that part of that
9 question. It is not embraced in the forest resources
10 inventory, sir, that I do know.

11 MR. ARMSON: Mr. Chairman, I think I can
12 clarify. Yes, Mr. Martel, there was a 66-foot road
13 allowance around the body waters, lakes and major
14 rivers and, yes, I believe about three or four years
15 ago because of some dispute by, I believe, some cottage
16 owners in the Haliburton area over whether they could
17 buy or control access, and the province changed
18 legislation and owners - and my wife happens to be
19 one - I was told that they can buy the frontage with a
20 66-foot road allowance.

21 I believe that's what you are referring
22 to.

23 MR. MARTEL: Yes. And it doesn't fit in
24 anywhere though in terms of the inventory?

25 DR. OSBORN: Not into the forest

1 resources inventory, sir, no.

2 THE CHAIRMAN: Can we take a break at
3 this time?

4 MR. FREIDIN: Yes.

5 THE CHAIRMAN: All right. Twenty
6 minutes.

7 MR. FREIDIN: How late are you planning
8 to go?

9 THE CHAIRMAN: I think today we are
10 planning to go to about 6:00, in and around that
11 nature. That will still have allowed for I think about
12 four and a half, five hours' worth of evidence today
13 which is probably enough.

14 MR. FREIDIN: Thank you.

15 THE CHAIRMAN: Thank you.

16 ---Recess at 4:05 p.m.

17 ---Upon resuming at 4:45 p.m.

18 THE CHAIRMAN: Thank you, ladies and
19 gentlemen.

20 Once again I apologize to everyone.
21 Every time I leave on one of these breaks I end up on
22 the telephone with my office or elsewhere and I sort of
23 get tied up without being able to get back quickly.

24 MR. FREIDIN: Q. Dr. Osborn, I think you
25 were at the second last, if not the last ownership

1 category on page 186. So could you perhaps finish off
2 your description of that document.

3 DR. OSBORN: A. Code No. 8, Ownership
4 code 8, speaks to something called Agreement Forest,
5 southern Ontario, and this ownership code for agreement
6 forests, this is not forest management agreements, this
7 is agreement forest in the sense with conservation
8 authorities or county forestry authorities or the
9 municipality or the authority will own the land and the
10 trees and, in fact, the Crown is contracted to very
11 often manage that resource.

12 This is like the FMA in reverse, private,
13 owner's land, ground contracted to do the management.
14 Typically southern Ontario, but not exclusively.

15 And the 9th class are Other Federal Land,
16 other, as opposed to the Federal Indian Reserve in
17 Ownership 6, other federal land like Camp Borden, Camp
18 Petawawa, some federal holdings, like army camps, that
19 sort of item.

20 So they are the nine ownership land use
21 type categories employed within the forest resources
22 inventory.

23 Q. Could you advise which of those
24 categories make up the area of the undertaking?

25 A. Yes. Ownership 1 and Ownership 7 is

1 Crown land, and within the area of the undertaking
2 there are parts of two parks, two provincial parks,
3 Algonquin Park and Lake Superior Provincial Park, which
4 in the FRI are classified as Ownership 5.

5 So there are two parts of those parks and
6 the rest of the area of the undertaking is Ownership 1,
7 Ownership 7.

8 Q. Can you tell me, Dr. Osborn, what
9 purpose is served by the information regarding
10 components and ownership?

11 A. If we stay with the Ownership 1
12 that's up on page 186 at the moment, the management --
13 first of all, the information is demarcated by
14 ownership land use. As a general piece of statistics,
15 that if you are describing a management unit, then
16 knowing what you have got in area and the ownership
17 land use rights to that is an important part of it in
18 that the timber management operations are typically
19 those conducted on Ownerships 1 and 7 as far as the
20 Crown direction is concerned.

21 So knowing the ownership has a relevancy
22 to what rights does the Crown have in terms of timber
23 management on which pieces of the real estate within
24 the boundary of the management unit.

25 So as there is in further south in the

1 undertaking some management units may have 25 per cent
2 of the area in patented land within the boundary of the
3 management unit. It is only the Ownership Crown 1 area
4 in there, and not the Ownership 3, that is subject to
5 the undertaking. So it has an impact upon what areas
6 as far as management practised as regards Crown
7 management.

8 If we turn back to the diagram on page 185
9 which was the coverage and components diagram, when we
10 went through that diagram we came right down to the
11 bottom when we talked of forested production forest
12 and reference was made, and reference had been made
13 earlier to the forested production forest is in fact
14 the base, the base that's used in the calculations in
15 any planning period for yield regulation.

16 So knowing how much you have got of the
17 different kinds of land and knowing how much that
18 actual area and its composition is for the production
19 base is rather vital as input into the next piece of
20 the panel which deals with yield regulation.

21 Now, at the same time, the fact that we
22 have the rest of the unit classified by those
23 components and indicated on the map sheet is rather
24 key, again, in management practices in being able to
25 see where something is, where is the production forest,

1 and where are the other items that may have a bearing
2 upon what you may do, what you can do, what is adjacent
3 to the production forest.

4 So the component listing, instead of just
5 having just a production forest and just a picture of
6 where that is on the map and what that is, the FRI
7 provides you with a more complete picture, what are
8 some of the other components of the land around your
9 particular production forest.

10 THE CHAIRMAN: But that gives you no
11 indication in the FRI of additional alternative uses
12 that may or may not be allowed within those Crown
13 areas, the Crown ownership areas 1 and 7.

14 DR. OSBORN: No, sir. The FRI provides
15 an estimate of what is out there, what do I see on the
16 photograph, what do I put onto the map sheet.

17 THE CHAIRMAN: It does not say anywhere
18 in the reports or anything like that whether hunting
19 and fishing is allowed within those areas as well?

20 In other words, you cannot look at
21 alternative uses other than the fact that it is used as
22 a production forest, for instance.

23 DR. OSBORN: That's correct. There is
24 no --

25 THE CHAIRMAN: From the FRI. I realize

1 that may come in in --

2 DR. OSBORN: The FRI is a straight
3 listing, description of what is out there. The usage
4 of that, which will be described in later panels, gets
5 into: Having got that, now on those different
6 components, what can I do.

7 THE CHAIRMAN: Okay.

8 DR. OSBORN: And I think the word
9 guideline was used extensively before.

10 THE CHAIRMAN: All right. We are not
11 going into that now.

12 DR. OSBORN: No, sir, I am not, okay.

13 MR. FREIDIN: As you indicated, Mr.
14 Chairman, how those other values and uses get
15 identified will be dealt with by other panels.

16 Q. Dr. Osborn, we have got a section of
17 the witness statement at page 31 of the -- actually it
18 starts at page 31 of the witness statement, part of the
19 outline, paragraphs 52 to 60, deal with the topic of
20 volume estimates.

21 And if I take you to page 32 and, in
22 particular, paragraph 60 and refer you to the last
23 sentence in paragraph 60 which says that:

24 "The user of the volume estimates..."

25 You are referring to the volume estimates

1 in the forest resource inventory:

2 "...must therefore be aware
3 of how these volume estimates are derived
4 in order to use the estimates
5 effectively."

6 When the use to which the inventory being
7 put is for timber management, Dr. Osborn, what is
8 important for the user to know about how the volume
9 estimate was derived and why is it important for that
10 person to know that?

11 DR. OSBORN: A. As was asked earlier,
12 the forest resources inventory's prime usage is the
13 basic data for forest management planning at the
14 management unit level. In addition, these are the
15 input data into forest management with the objectives
16 of continuous/predictable supply.

17 And so, in answer to: What do we need to
18 know in terms of volume, industry is looking for
19 volume, it is looking for species which is contained,
20 as we have described, within the FRI.

21 We have also talked and gone through the
22 FRI about the components of how the species go into
23 working groups, how within the working groups we can
24 establish site class with height/age relations, how we
25 go through measurements to estimate stocking, we look

1 up provincial tables to get estimates of volume growth.

2 We spent some time and effort because the
3 key part of that line on paragraph 60 is the need to
4 understand how those things were all done and derived
5 before those data can be used for the management
6 planning exercise for which they were designed.

7 So what is important to know in how those
8 volume estimates are provided and how they are derived
9 is the process: What did we go through, what did we go
10 through on the ground, what did we go through in the
11 photointerpretation, what were the compilation,
12 mechanics.

13 As we went through that process we
14 illustrated: When did we take measurements, when did
15 we provide estimates, what was the sample, what was
16 measured on the ground, where did we extrapolate.

17 Now, in paragraphs 54, 55, 56, 57 on
18 pages 31 and 32 are paragraphs with sets of words
19 describing all those steps about site class and
20 stocking, predominant species that we have been through
21 in some detail to ensure an understanding of the
22 process.

23 The 58 and 59 paragraphs on page 32, we
24 demonstrated how stocking could be used to reduce the
25 volume and the growth rate to reflect the stocking

1 found on the stand. So in terms of what we need to
2 understand how that's all done, why we need to
3 understand that and so that when we do use those data,
4 for the purposes of forest management planning and,
5 therefore, yield regulation, we have some understanding
6 of how they have been done to enable us to estimate
7 what we mean when we go through the yield regulation.

8 If we used those data and those maps that
9 go with that to do other management planning
10 activities, not only how much do I do, but where do I
11 do it, let's make sure again the way the data were
12 derived and the way they have been presented on maps
13 and tables is understood.

14 It is a user awareness that is absolutely
15 vital in any set of data and, because of past history
16 and past records of what people have said about the
17 FRI, it is absolutely key that the understanding of the
18 whole process be made.

19 MRS. KOVEN: Excuse me, Dr. Osborn. Are
20 these data accessible by industry or do they indirectly
21 use and benefit these data through the management unit?

22 DR. OSBORN: For company management units
23 and for forest management agreement areas, that is with
24 the large licencees, the process of the inventory is a
25 joint enterprise and, in fact, I have a slide a little

1 later about who does what in terms of how the
2 partitioning of the work is done.

3 With industry, with forest industry large
4 licencees, it is a shared effort, a shared resource.
5 So the forest industry end up with their copy with the
6 same set of data as the Crown does.

7 We spoke -- I'll turn to Exhibit 82. We
8 talked a little bit earlier about, for example, Gordon
9 Cosens forest at Spruce Falls Pulp and Paper. The
10 inventory for that area is being done literally right
11 now, scheduled for completion this year, and one of the
12 members of the audience will be delighted if it is done
13 so. That has been a three-year effort, joint effort
14 between company and Crown sharing the work, sharing the
15 result.

16 The same set of maps, the same set of
17 data will go out to both the district office and the
18 company to be used for forest management planning. In
19 that context, it is a jointly shared, both process and
20 resource. It isn't: They have got their version we
21 have got ours.

22 MRS. KOVEN: So there is nothing
23 proprietary about information on stands on volume of
24 wood by specific...

25 DR. OSBORN: As far as I understand, and

1 I am no lawyer, I understand this is in the public
2 domain and, therefore, those data are accessible to be
3 looked at and this has generally been the attitude we
4 have taken, to be looked at in the public domain.

5 To continue that the maps, for example,
6 the forest stand map was Exhibit 85, that sort of map
7 sheet is publicly available and sold through the Public
8 Information Centre of the Ministry of Natural
9 Resources. So a member of the public with an interest
10 can buy and, in fact -- step one step backwards. The
11 aerial photographs that were exhibited, 84, are very
12 widely sold by the Crown. In fact, far more members of
13 the public buy those than in fact are used in the FRI
14 process.

15 So the photograph, the map sheet, is
16 certainly in the public domain in terms of being sold.
17 There is nothing proprietary per se about the data.

18 MRS. KOVEN: So industry is certainly one
19 of your largest client groups, one of the groups that
20 you service?

21 DR. OSBORN: Yes.

22 MRS. KOVEN: Most directly.

23 DR. OSBORN: Yes.

24 MRS. KOVEN: And do you receive good
25 comments from industry, are they generally pleased with

1 the FRI?

2 We will hear about that later, I suppose,
3 but --

4 DR. OSBORN: No doubt, but there is a
5 range from satisfaction to concerned. And just to
6 follow up on that, within the three-year process - and
7 let me stay with the example of Spruce Falls for a
8 moment - within the three-year process, year one before
9 the photographs get flown, before the contract gets
10 flown, we are in Kapuskasing, we, main office, in
11 Kapuskasing with the company with the Crown.

12 What area is going to be inventoried,
13 what have you got in terms of data, what do you
14 understand in the process, what do you want in terms of
15 output, how do you want your forest stand map to look,
16 how do you want your data presented.

17 And it so happens with that company, in
18 the current process, some of the products - forest
19 stand map as an example - has been customized to suit
20 the requirements, mutually agreed, company and Crown in
21 Kapuskasing. So we have as a service agency attempted
22 still staying standardized so the data are added to
23 between Spruce Falls, Kimberly-Clark, et cetera. It is
24 a necessity that I have to ensure the provincial data
25 follows standard. Given that, there is an effort made

1 to customize to suit local requirements.

2 MR. FREIDIN: Q. Dr. Osborn if, unlike
3 the situation in the management unit you just referred
4 to, the FMA holder or the large company licensee does
5 not get involved, let's just assume they do not get
6 involved in assisting the Crown in doing the FRI, is
7 the FRI nonetheless made available to the licensee for
8 timber management purposes?

9 DR. OSBORN: A. The reason I hesitate
10 and think is the last time this happened that I can
11 seriously remember was some time back in the 70s when
12 there was an area I think that was put under licence to
13 Kimberly-Clark.

14 If I remember correctly, it was
15 somewhere up in the corner on Exhibit 82 of the corner
16 of what is called the Long Lac forest and there, if I
17 remember correctly, the FRI was done by the Crown at
18 the Crown's expense, there was no direct involvement
19 with the company, and the area I think subsequently was
20 licensed to Kimberly-Clark.

21 And at that time we sold them the data.
22 We sold them the data, we sold them the maps, we sold
23 them the photographs, we sold them the inventory.

24 Now, as far as I can remember, this is
25 the last time a large licensee has not been in some

1 way, shape or form involved in the preparation of the
2 inventory.

3 MR. MARTEL: Do you do that on Crown land
4 then for, let's say, an independent cutter and he is
5 going into an area and the Crown is responsible for
6 that area and you do the inventory, do you get
7 assistance from the small operators, or do you do it
8 primarily yourself?

9 DR. OSBORN: I can't think of an
10 instance, Mr. Martel, when we have not -- we, the
11 Crown, have not done it ourselves. I was trying to
12 think and it sort of really depends upon how small the
13 small operator is.

14 Generally, but not exclusively, on the
15 Crown management units the Crown itself has done the
16 entire FRI. The management planning process is the
17 responsibility of the Crown on those units and given
18 the FRI is designed for that management planning
19 process we, the Crown, have done the work and have used
20 the data.

21 So I cannot recall an instance of a small
22 licensee, a small operator, directly getting involved
23 in some of that process. Now, there may have been --

24 MR. FREIDIN: Q. Sorry, getting involved
25 in that process, you are talking about the FRI process?

1 DR. OSBORN: A. Of producing the FRI,
2 which was Mr. Martel's question.

3 Q. Yes. Could I ask you: Was the FRI
4 designed to provide volume estimates at the stand
5 level?

6 A. No, it was not, that was not the
7 original idea and thought in the design or the original
8 objective.

9 Q. And when I use the phrase volume
10 estimate at the stand level and you said it wasn't
11 designed for that, what does volume estimated at the
12 stand level mean?

13 A. That for each and every stand there
14 is an estimate of the volume. Literally for each and
15 every stand, as described in the process we have been
16 through in the last two hours and as reflected in the
17 data that go with the forest map sheet.

18 Q. The information that you went through
19 in those yield tables permitted an estimate to be made
20 of the volume of those stands?

21 A. That's correct.

22 Q. What do you mean when you say that
23 the FRI was not designed to provide volume estimates at
24 the stand level, having regard to the fact that there
25 are estimates made?

1 A. Okay. The mechanics of how to
2 produce the volume estimate at the management unit
3 level, which is really which is where part of the FRI
4 is coming from - the FRI produces more than volume -
5 but the volume estimate at the management unit level
6 could come from a variety of mechanisms. In fact, in
7 later discussion about how inventory is done in Ontario
8 versus other jurisdictions, this may well be referred
9 to.

10 There are alternative ways of providing
11 volume estimate for the management unit. To give you
12 one example. We could put in, in the management unit,
13 5, 10, 50, 100 sample plots; we could measure the
14 volume on every one of those sample plots as a sample,
15 and knowing the area of the sample and knowing the area
16 of the inventory of the total management unit, we could
17 extrapolate.

18 It is a process that is in some ways very
19 similar to that which is done in parts of the
20 northeastern U.S. That is a way of providing a volume
21 estimate for the entire unit.

22 Ontario decided not to do that. Ontario
23 decided that, in fact, it would estimate the volume for
24 the unit by going and having a description at each and
25 every stand and aggregating those data upwards, because

1 in Ontario they wanted to know not only an estimate of
2 what you had in total on the unit, but where were those
3 stands.

4 Those parts of the world that produce the
5 volume estimate the way I first described, a sample,
6 150, 150 sample plots in the unit, extrapolate upwards,
7 it happens in several states in the U.S., have perhaps
8 a good estimate of how much, but little or no knowledge
9 of where.

10 Ontario decided in its basic design that
11 that approach was not going to be taken and so we went
12 the route of describing stand-by-stand-by-stand and
13 aggregate the data upwards and provide the map of where
14 things were.

15 Now, inbetween the two extremes there is
16 a range of possible permutations. It is a design
17 choice and it comes all the way back to objectives of
18 management: What are you looking for? You want to
19 know what you have got, how is it changing or where it
20 is, and you mix and marry the answers to those three
21 questions to end up with a design that seems to best
22 suit your management objective.

23 The process I have described is the
24 design and procedures that Ontario has followed.

25 Q. Did Dean Baskerville comment on using

1 the forest resources inventory for stand level
2 decision-making?

3 A. Yes, he did.

4 Q. And perhaps you could refer us to the
5 section of that report which I believe is Exhibit 16.

6 A. Okay. Exhibit 16--

7 Q. Yes.

8 A. --on page 44.

9 Q. Yes.

10 A. On page 44 of that document, on the
11 beginning of the second full paragraph, approximately
12 halfway down the page, there is a paragraph that
13 starts:

14 "It is worth repeating that the FRI is
15 not an unreasonable basis used in current
16 forest management planning, but it was
17 not designed for stand level
18 decision-making and is incorrectly
19 applied at this level. However, it must
20 be noted there is much suspicion of FRI
21 expressed publicly; some, perhaps most,
22 of the comments reflect a poor
23 understanding of FRI and its intended use
24 but the fact remains that the credibility
25 of the system has been challenged."

1 Q. And are you aware of the report
2 entitled: An Assessment of Ontario's Forest Resources
3 Inventory System and Recommendations for its
4 Improvements by Dr. Bob Rosehart?

5 A. Yes, I am.

6 MR. FREIDIN: Has that been made an
7 exhibit? I can't recall.

8 THE CHAIRMAN: No, I do not think it has
9 been made an exhibit, I don't believe.

10 MRS. KOVEN: No, it wasn't.

11 MR. FREIDIN: Does the Board...

12 THE CHAIRMAN: We have got copies.

13 MR. FREIDIN: I think you have asked for
14 them.

15 THE CHAIRMAN: They showed up today in
16 Mr. Mander's office. We got them but we have not -- we
17 were waiting for you to introduce them before we...

18 MR. FREIDIN: And did you get the
19 Newsrelease along with it? I have made the Newsrelease
20 available to everybody else, so I...

21 THE CHAIRMAN: I think there was a
22 Newsrelease with it, but I do not think it is here.

23 MR. FREIDIN: Who doesn't have copies?

24 MR. MARTEL: Mine is upstairs.

25 MR. FREIDIN: (handed)

1 MR. MARTEL: Yes, thank you.

2 THE CHAIRMAN: We do not have the
3 Newsrelease with us. I think we got it. Is that the
4 Newsrelease?

5 MR. FREIDIN: (handed)

6 THE CHAIRMAN: Okay. Ladies and
7 gentlemen, we will make the Newsrelease dated June 9th,
8 which is a Newsrelease by the Ministry of Natural
9 Resources as Exhibit 92.

10 ---EXHIBIT NO. 92: Newsrelease dated June 9 by the
11 Ministry of Natural Resources.

12 THE CHAIRMAN: And the Rosehart Report
13 itself dated September, '87 will be Exhibit 93.

14
15 ---Exhibit NO. 93: Report entitled: An Assessment of
16 Ontario's Forest Resources
17 Inventory System and
18 Recommendations for Its
Improvements by R. Rosehart
dated September, 1987.

19 MR. FREIDIN: Q. And, Mr. Armson, I
20 understand that the committee of which Dr. Rosehart was
21 the chairman was assembled or put together as part of
22 the Ministry's action plan arising out of the report of
23 Dean Baskerville?

24 MR. ARMSON: A. That is correct. This
25 was action plan No. 16.

1 Q. And, Dr. Osborn, does Dr. Rosehart
2 comment on the appropriateness of the forest resources
3 inventory regarding accuracy and design for forest
4 management planning purposes?

5 DR. OSBORN: A. Yes, he does.

6 Q. Could you direct the Board to the
7 section that you are referring to?

8 A. It's given on the page before, page
9 1.

10 Q. Entitled: Summary of Findings and
11 Recommendations?

12 A. Yes, sir. In the beginning, the
13 first paragraph reads:

14 "The committee has found that Ontario's
15 forest resources inventory (FRI) is
16 sufficiently accurate when used for the
17 purpose originally intended. The FRI's
18 current mandate is to provide a picture
19 or an approximation of existing forest
20 conditions and an information base for
21 decision-making and planning for a
22 variety of resource managers for OMNR
23 '86-A. The committee recognizes that
24 competition for the use of Ontario's
25 forest resources has increased

1 interchanges in forest product mills,
2 increased international trade, and public
3 concern for environmental quality.
4 Increased competition for forest
5 resources has meant users require more
6 accuracy in assessing the amount of
7 forest resources available in order to
8 make important strategic decisions. This
9 need has led some users to believe that
10 the current conceptual design of the FRI
11 is outdated."

12 And the second comment under Summary and
13 Findings -- Findings and Recommendations reads:

14 "The committee agrees that FRI techniques
15 need updating but it finds the current
16 conceptual design of the FRI is
17 essentially sound. It is important to
18 remember that the FRI is intended for
19 macro-planning forest management
20 purposes, it was never designed to
21 provide data for use at the operating
22 level. The FRI must be supplemented by
23 more detailed surveys in particular,
24 operational cruising, OPC, to meet these
25 needs. The major question facing the

1 committee was whether the FRI together
2 with the appropriate supplementary
3 information is ensuring that adequate
4 information is being collected and made
5 available for forest management
6 purposes."

7 Q. And in that second paragraph then
8 when it says in the third sentence:

9 "...it was never designed to provide data
10 for use at the operating level."

11 Do you know what that means?

12 A. Primarily, much as Dr. Baskerville
13 alluded to, operating level is a stand-by-stand
14 decision-making implementation.

15 Q. And what does the meaning --
16 macro-planning mean in this context, or are you aware?

17 A. I would assume the macro-planning is
18 management unit level management planning.

19 Q. Why might it be necessary for
20 supplementary -- why might it be necessary to have
21 supplementary information to the forest resources
22 inventory?

23 A. There are a variety of reasons. In
24 addition to the FRI, other information is necessary.
25 The first is there may well be a need for other

1 information that is not provided by the FRI. For
2 example, in describing the forest resources inventory,
3 there is no description of tree size, tree count,
4 product in terms of timber product, tree quality.

5 Those timber parameters are needed for
6 the level of planning, they are not contained within
7 the FRI and, therefore, one has to somehow provide an
8 estimate for them.

9 The second main reason is you may find
10 that the level of precision or the accuracy of the FRI
11 and the fact that it provides estimates primarily in
12 volume, in gross total volume may not be - especially
13 for a smaller area than the management unit, a subset
14 of the management unit - may not be accurate enough.

15 So dealing with 1, 2, 3, 4, 10 stands
16 with a process that estimates what is available on
17 10,000 stands may not be adequate.

18 We have talked earlier about gross total,
19 gross merchantable, net merchantable volume and
20 although estimated in the FRI, the estimates are based
21 upon some provincial level details. Maybe those data
22 need to be added to and/or refined with local
23 modifiers.

24 The third part -- the third reason there
25 may well be need for supplemental information is if the

1 managers are looking for: Well, what do I do with
2 these stands in terms of harvesting and regeneration,
3 how do I treat this inventory, how do I treat these
4 stands under management, the FRI describes an estimate
5 of what is there, but does not provide an inference as
6 to what may happen when you cut it and what may happen
7 when you try and regenerate it.

8 There is no silvicultural knowledge
9 embedded in a forest resources inventory. If for
10 managerial reasons that is needed, one obviously has to
11 take additional information to help answer those
12 questions.

13 Q. In looking at one of the categories
14 that you mentioned, you referred to whether or not you
15 needed supplementary information may depend on product.
16 What do you mean by that?

17 A. Certain mills require certain kinds
18 of trees. If we take a saw mill and he is looking for
19 saw logs, saw logs typically are looked for in certain
20 size classes. So I might be interested, if I am
21 running a saw mill and I am managing the supply for a
22 saw mill, how many trees have I got that are 8 inches,
23 10 inches, 20 centimetres, 25 centimetres, 30
24 centimetres in diameter; 4 metres, 10 metres long.

25 How many veneer bolts, logs that go into

1 a veneer mill, do I have. These are examples in a
2 timber sense of product, the FRI does not provide
3 estimates of those.

4 Q. What is a veneer bolt?

5 A. A veneer bolt. A bolt is another
6 expression for log. So translate log into bolt.
7 Veneer is the process whereby usually in Ontario you
8 put that log or bolt into a mill and you peel it and
9 put it on like a lathe, spin it around, put a sharp
10 knife and peel it.

11 Q. Does it require that a tree has
12 certain characteristics to qualify as a veneer log?

13 A. Yes, most veneer mills would require
14 relatively straight, round, cylindrical, knot-free,
15 even-growth rate, and I could probably think of some
16 more criteria too. I am looking almost for the ideal
17 cylindrical branch-free, knot-free type input.

18 Q. Thank you. Are there sources of the
19 type of supplementary information that you refer to?

20 A. There are.

21 Q. And could you list them for me?

22 A. There will be a list of them, and
23 they range, and the appropriateness will vary for some
24 of the different facets we alluded to earlier.

25 The first source - and we have alluded to

1 this earlier when we talked of sustained yield - are
2 past records: What has this area had before; what has
3 this area produced before; did the adjacent stands ever
4 get cut and were used for saw logs; veneer mills; did
5 the adjacent stands ever get cut and were attempted to
6 be regenerated; what did the past record show adjacent?

7 The second facet in the answer would be:
8 What experience do I have - there is a quotation in Dr.
9 Baskerville's report about that - what experience do I
10 have in the past from comparing what did the forest
11 resource inventory estimate was there and what did the
12 scale of what went into the mill determine that I
13 actually realized from that area.

14 Is my FRI typically producing what it
15 says is out there, five per cent less, five per cent
16 more? Most companies have a feeling that typically
17 their FRI has some reflection of what they might get.

18 The third way is to have some
19 supplementary estimate by I either walk in the stands,
20 I fly over the stands. So there is a degree of
21 practicality depending upon size and access of the unit
22 and where the area of interest is as to whether I visit
23 it on foot or by air.

24 Q. What sort of supplementary
25 information would you get by walking through the woods?

1 A. We could both look and see and
2 estimate, in terms of most foresters have, through
3 practice, the ability to walk through forest stands and
4 as they go they will estimate how much volume, and
5 literally you will learn to walk through stands and
6 estimate how tall, what is the basal area, what is the
7 volume, and will carry a prism like we described and
8 this is an inherent part of the trade.

9 So you could walk through literally and
10 pick up some additional information. The same would
11 apply to regeneration capability. You walk through and
12 you see what the understory vegetation is and infer
13 what the sites might be. And Mr. Armson made some
14 earlier allusions to those sorts of site features that
15 you could observe walking through the forest.

16 Similarly, you could capture some of
17 those sorts of observations from an aerial observation
18 from, usually a helicopter which is easy.

19 The fourth item, which is a continuation
20 of the third, were to take supplementary aerial
21 photography. You fly over the area we take, as the
22 title suggests, additional photography.

23 Maybe the inventory was done five years
24 ago and you feel that something has changed in the five
25 years or you know something has changed. There is no

1 new FRI scheduled, but local field foresters may well
2 fly, with a 35-millimetre camera, and do supplementary
3 aerial photography on a part, that part of the unit
4 that is of concern to this management decision. And
5 that is the fourth category.

6 The fifth category is to conduct surveys
7 that would look particularly at soil, site,
8 regeneration capacity. There are some schemes, some
9 site classification schemes like the forest ecological
10 classification or FEC.

11 Q. F-E-C?

12 A. F-E-C, which I think has been alluded
13 to in Panel 2?

14 Q. Correct.

15 A. I think also in Panel 2 there was an
16 allusion to the forest land and productivity surveys or
17 FLAPS that took place in the northeastern region, site
18 inspection, mapping, site features, soil, site
19 features, vegetation features, which have an impact
20 upon cutting regeneration. So a fifth set is some
21 supplementary survey for soil, site, vegetation
22 characteristics.

23 The sixth on my list, and the last, is a
24 formal operational cruise. A more refined, a more
25 detailed, a more intensive estimate of what is on this

1 area I need to know more about for management purposes.

2 Q. Dr. Osborn, can you advise who makes
3 the decision as to whether the supplementary
4 information is required in order to make decisions at
5 the stand level?

6 A. In Exhibit 78, the evidence for this
7 panel, on page 33 in paragraph 63. So on page 33,
8 paragraph 63, there is a statement that explains much
9 of that which I have just said and the decision as to
10 whether or not these additional data are required is in
11 fact made by the forest manager.

12 Q. And in the case of management units
13 that you have referred to, who is the forest manager?

14 A. Not being completely familiar with
15 the timber management planning process or who is the
16 committee chairman, or the committee that goes into the
17 timber management planning process, I assume the
18 chairman of the timber management planning committee
19 that goes into that timber management planning process.

20 Q. And when is supplementary
21 information -- are there situations where supplementary
22 information may be more likely, the need for it more
23 likely than not?

24 A. Yes. And again on page 33 in
25 paragraph 63 there is allusion to inferences that have

1 been made earlier in the evidence that where there is a
2 greater diversity, as shown in the FRI, species
3 compositions, age-class mixes, and/or where the forest
4 itself in terms of terrain is diversified, all of those
5 sorts of characteristics may necessitate or may warrant
6 a more careful look because, as was spoken to, the FRI
7 becomes a little bit more difficult in areas where
8 there is incredible diversity, particularly in the
9 arrangement within the stand.

10 Q. I am going to ask you in a moment to
11 describe the operational cruises that you refer to but,
12 before you do that, can you advise: Is the operational
13 cruising that you refer to, which I understand is
14 referred to as OPC, is that a different procedure than
15 the ground sampling or cruising that is done in the
16 second year of producing the forest resources inventory
17 which you described earlier in your evidence?

18 A. Yes, and with reference to the
19 diagram describing the timing in Ontario's forest
20 inventory, this diagram demonstrates - we are talking
21 of Ontario's forest inventory - it demonstrates this is
22 done essentially as a two-stage sample, of which the
23 first stage was the forest resources inventory (FRI),
24 and the second stage is the operational cruise (OPC).

25 So the original FRI -- the original

1 forest inventory design in Ontario, which is done on a
2 management unit basis, the original design was
3 conceived as a two-stage process, FRI on the total
4 management unit, operational cruise on a part of the
5 management unit.

6 Now, the question asked whether or not
7 the ground sample in year two of the FRI was different
8 from the operational cruise. The answer is very
9 definitely so. We have two quite distinct different
10 kinds of cruise, generic timber forestry word.

11 So year two's ground sample in the FRI,
12 which we described using the prism and the height
13 measuring as a precursor to photointerpretation, is a
14 different kind of cruise than that which is conducted
15 as an operational cruise. It is different in the sense
16 of the area it covers, the ground sample for
17 photointerpretation, the FRI covers the entire
18 management unit.

19 MR. CASTRILLI: Excuse me, Mr. Chairman,
20 can my friend advise as to what page in Exhibit 78 that
21 overhead is from -- it appears on?

22 MR. FREIDIN: I am not sure whether it
23 does appear.

24 DR. OSBORN: It does not appear as an
25 exhibit.

1 THE CHAIRMAN: Were you intending to put
2 it in as an exhibit at all?

3 MR. FREIDIN: I am not sure that it would
4 be necessary, but...

5 THE CHAIRMAN: I do not think there is
6 much on it. If they have not got it prepared as an
7 exhibit, I think everyone could just copy down some
8 information.

9 MR. FREIDIN: That was just being used by
10 the witness to assist in his explanation.

11 THE CHAIRMAN: Okay.

12 DR. OSBORN: In year two, ground sample
13 covered the entire management unit as a precursor to
14 photointerpretation. The operational cruise is
15 conducted on a smaller part of the management unit. It
16 covers, the operational cruise, the smaller part covers
17 the planned operating area. And, again, the title
18 covering the planned operating area is alluding to the
19 operational cruise, is geared towards this
20 supplementary operational level data.

21 MR. FREIDIN: Q. Could you advise, Dr.
22 Osborn, is the second step or the stage 2 of the forest
23 inventory always necessary?

24 DR. OSBORN: A. Yes. And the reason for
25 my hesitation is I was trying to think if there had

1 been examples where some form of photointerpretation
2 and ground cruising had not taken place.

3 And the reason for my hesitancy is within
4 the forest resource inventory, there had been some
5 instances where we had not completely re flown and wiped
6 the maps clean with a new photointerpretation.

7 There had been some instances in the
8 inventory where we have taken the past inventory, new
9 photographs, partial photointerpretation, ground
10 cruising of some shape or form and records to update
11 the forest resource inventory.

12 So I hesitated because I had to think of
13 units where that may have taken place.

14 Q. At the present time, is it necessary
15 to do an operational cruise in addition to the forest
16 resources inventory in order to do timber management?

17 A. It is not a necessity and, as the
18 words in paragraph 63 on page 33 state, the need for
19 that supplemental information is made by the local
20 forest manager depending on a range of conditions, a
21 range of circumstances, management objectives, past
22 knowledge. So the answer to the question is no, it is
23 not a necessity.

24 Q. Do I understand you -- are there
25 therefore situations where the forest resources

1 inventory, together with supplementary information
2 other than OPC, will allow the forest manager to make
3 reasonable timber management decisions at the operating
4 level?

5 A. I don't work at that level, but as
6 far as I understand, yes.

7 Q. Okay, thank you. Could you
8 explain -- I just have one more. Is the forest
9 resources inventory an estimate of the entire
10 management unit?

11 A. Yes.

12 Q. If an operational cruise, an OPC is
13 deemed necessary, on what area is such a survey
14 normally conducted?

15 A. It is usually conducted on that area
16 that is of interest in operational management for the
17 next five-year period.

18 Q. And how does the area to be operated
19 on in the next five years compare to the area of the
20 entire management unit, in very general terms?

21 A. I earlier used the word "small". The
22 OPC is done on a small part of the management unit.
23 Very hypothetically, our management unit as outlined on
24 this piece of paper, the total outside boundary and in
25 the management on that unit we could envisage, on

1 average, a rotation maybe of a hundred years. Our
2 inventory, our forest resource inventory covers the
3 entire management unit.

4 The area of operation for the next five
5 years will be the area for operational planning. The
6 area for five years out of a hundred-year rotation
7 indicates a sort of five per cent sample. So out of
8 the management unit, and that part of the management
9 unit that we are going to manage on production forest,
10 we are really only looking at OPC in something in the
11 order of five to maybe 10 per cent, depending on the
12 rotation of the entire management unit.

13 So when I use the word "small", we are
14 looking at five to 10 per cent.

15 Q. And when you refer to that five or 10
16 per cent, are you speaking of the entire area in the
17 management unit?

18 A. No, I am talking of the five or 10
19 per cent that speaks to the production forest base
20 which is obviously less than the total area of the
21 management unit.

22 Q. I am going to ask you, Dr. Osborn,
23 to --

24 MRS. KOVEN: Excuse me, Mr. Freidin.

25 MR. FREIDIN: Sorry.

1 MRS. KOVEN: I just wanted to ask Dr.

2 Osborn: What year did OPC start? It was some time
3 after the 19 -- the last document we had in the witness
4 statement developed.

5 DR. OSBORN: I am not honestly sure of
6 the answer, but if I come back to the slide that was
7 previously shown, the initial FRI design which came out
8 of the 1940s had the concept of a two-stage process.

9 So in the concept, the FRI and the OPC
10 were part of the original thought. Now, whether or not
11 OPC was started and used right from the late 1940s
12 onwards, I can't honestly comment.

13 Certainly when I joined in the 60s
14 operational cruising was a way of life.

15 MR. FREIDIN: Q. I am going to ask you
16 in a moment, Dr. Osborn, to explain how an operational
17 cruise is performed, but before you do that - and I
18 understand that may take some time - could you, perhaps
19 in advance of giving that evidence, explain or advise
20 the Board what the message is that your evidence about
21 how an OPC is done is intended to convey?

22 In other words, can you tell us why you
23 are going to be telling us about how you do an OPC?

24 DR. OSBORN: A. Just before I do that, I
25 would like to sort of follow up on Mrs. Koven's

1 question.

2 Q. Don't ask me to repeat the question,
3 please.

4 A. In earlier forest management planning
5 manuals there was a statement as to the objectives of
6 OPC. So with manuals going back to the 60s the
7 operational cruise had a set of objectives and these
8 are sort of -- pick up some parts of the previous
9 explanation of what additional information is required
10 and why. And those objectives included verification of
11 the FRI.

12 Remember, the two-stage process. The
13 second part was to obviously pick up and add to, which
14 was to verify correct.

15 The second main objective of OPC was to
16 estimate net merchantable volume and, again, we have
17 spoken to the FRI and GTV, what goes into the mill door
18 and that description of gross merchantable, net
19 merchantable trees and I mentioned it is only recently
20 we started in the FRI to speak to net merchantable.

21 So back in the 60s and 70s, how did we
22 get net merchantable, some form of additional cruise.

23 And the third major objective of an OPC
24 was to determine the harvest regeneration procedure.

25 Now, I bring this to your attention in

1 partial answer to Mrs. Koven's question. This comes
2 back from certainly the 60s, but even today this is
3 starting to change and there was an earlier question:
4 Is it a necessity to do OPC?

5 With the process now in the FRI of
6 ensuring as much as possible of the data and the
7 records come from field foresters at the beginning,
8 there is less and less of a necessity to deal with that
9 one because some of the data is coming directly from
10 the field.

11 The estimate of net merchantable volume,
12 that is still a requirement for some products but past
13 records and past knowledge and certainly the records
14 and knowledge of industry have found, in many cases,
15 the FRI and local knowledge has provided a relatively
16 reliable estimate of net merchantable volume for some
17 products.

18 If you are running a pulp mill, local
19 knowledge of what you have got and the ability to
20 translate the FRI into net merchantable volume is done
21 in a practicality.

22 The third item, the harvest regeneration
23 silviculture story. We made reference to FEC and FLAPS
24 procedures now in the field, practices now in the
25 field, whereby field foresters, additional surveys have

1 replaced, to some extent, the need for this objective.

2 So when the question was asked: Is OPC a
3 necessity, and they were the objectives of OPC,
4 recognize that some of those have now been spoken to as
5 processes change within the Ministry.

6 Q. I will try to repeat the question,
7 Dr. Osborn. Could you explain -- I am going to ask you
8 to explain the OPC and could you provide or indicate to
9 the Board the message that your evidence about how an
10 OPC is done, what message is it intended to convey as a
11 part of that evidence?

12 A. There is four main bottom line
13 statements.

14 THE CHAIRMAN: We ended up with three
15 objectives formerly, most of which he has discounted in
16 the 1980s. Now we are ending up with four rationales
17 for telling us why you no longer need them.

18 DR. OSBORN: Not quite, sir. Not quite.

19 THE CHAIRMAN: I am being a little
20 facetious. We just went from three to four in quick
21 order there and I thought we were missing something,
22 perhaps not.

23 Go ahead.

24 DR. OSBORN: The first, the operational
25 cruise procedure is complex; the second, the

1 operational cruise procedure is costly; the third is
2 the operational cruise procedure requires care as to
3 how it is done, and that's care with who does it and
4 how do they do it.

5 And the fourth bottom line comment, which
6 is perhaps the most important of all, is that having
7 done an operational cruise, you still have only an
8 estimate of what is out there.

9 In all practicality, no operational
10 cruise that I am aware of in Canada is a hundred per
11 cent cruise. So it is a sample, we are into some
12 statistics and we have an estimate with an associated
13 sampling area. The four bottom lines.

14 MR. FREIDIN: It is ten to six. I am
15 wondering whether that might be a convenient time to
16 stop because we are going to have Dr. Osborn start with
17 his explanation of OPC.

18 THE CHAIRMAN: All right. Why don't we
19 leave that until tomorrow.

20 I take it that these four rationales that
21 you are going to put to the Board is geared towards
22 explaining -- is geared towards allowing us to
23 understand what an operational cruise is, so that you
24 can justify ultimately why they may not be needed in
25 the industry or why it is, because of these four

1 factors, they may not give you the reliability or they
2 may not be as useful as one might otherwise think.

3 Is that where you are going?

4 DR. OSBORN: Part of it, sir, but also
5 the other part is to make you aware of the process to
6 realize where they are applicable and where they are
7 appropriate. There are both sides to that story.

8 THE CHAIRMAN: Why don't we leave that
9 until tomorrow.

10 MR. FREIDIN: 8:30?

11 THE CHAIRMAN: At 8:30 a.m. tomorrow.

12 MR. FREIDIN: Thank you.

13 THE CHAIRMAN: Thank you.

14 ---Whereupon the hearing adjourned at 5:50 p.m., to
15 reconvene Thursday, June 30th, commencing at 8:30
a.m.

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